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## SUMMARY OF RESULTS

The results of the Method 5 tests for quantifying particulate matter emissions as collected at the #3, #4 and #5 Furnace stacks on February 5-6 and 26, 1992 are summarized in Table 2.1 below, and on pages 5-7 in a series of computer printouts titled "Summary of Results - Methods 1, 2, 3A, 4, and 5."

**Table 2.1.** Summary of particulate matter emission results collected at Furnace's ~~#3, #4 and #5~~ at Ball-InCon Glass Packaging in Seattle, Washington on February 5-6 and 26, 1992.

Run #	Front-Half Partic. Matter (gr/dscf)	Back-Half Partic. Matter (gr/dscf)	Total Partic. Matter (gr/dscf)	Dilution Corrected Partic. Matter (gr/dscf)	Mass Emiss. Rate (lb/hr)
<del>Furnace #3</del> <b>Regenerative furnace</b>					
<del>Run 1</del>	<del>0.007</del>	<del>0.005</del>	<del>0.011</del>	<del>0.021</del>	<del>2.69</del>
<del>Run 2</del>	<del>0.007</del>	<del>0.003</del>	<del>0.011</del>	<del>0.018</del>	<del>2.60</del>
<del>Run 3</del>	<del>0.006</del>	<del>0.002</del>	<del>0.008</del>	<del>0.013</del>	<del>1.97</del>
<del>Average</del>	<del>0.007</del>	<del>0.003</del>	<del>0.010</del>	<del>0.017</del>	<del>2.44</del>
Furnace #4					
Run 1	0.020	0.010	0.029	0.064	7.08
Run 2	0.035	0.009	0.044	0.098	10.5
Run 3	0.017	0.010	0.027	0.060	6.49
Average	0.024	0.010	0.033	0.074	8.02
<del>Furnace #5</del> <b>Regenerative furnace</b>					
<del>Run 1</del>	<del>0.022</del>	<del>0.009</del>	<del>0.031</del>	<del>0.064</del>	<del>3.16</del>
<del>Run 2</del>	<del>0.020</del>	<del>0.013</del>	<del>0.033</del>	<del>0.080</del>	<del>3.79</del>
<del>Run 3</del>	<del>0.018</del>	<del>0.013</del>	<del>0.030</del>	<del>0.061</del>	<del>3.85</del>
<del>Average</del>	<del>0.020</del>	<del>0.012</del>	<del>0.031</del>	<del>0.064</del>	<del>3.60</del>

The front-half, back-half, total and dilution corrected particulate matter emission concentrations in Table 2.1 are presented in units of grains per dry standard cubic foot (gr/dscf). The particulate matter mass emission rate is presented in pounds per

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5  
AM TEST - AIR QUALITY, INC.

FILE NAME: 145\BI#4SUM  
CLIENT: BALL-INCON  
LOCATION: SEATTLE, WASHINGTON

#4 FURNACE STACK EXHAUST

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	1497	1498	1499	
DATE:	2/6/92	2/6/92	2/6/92	
START TIME:	08:36	11:13	13:30	
STOP TIME:	10:40	13:18	15:56	
SAMPLE LENGTH (minutes):	120.0	120.0	120.0	
PROCESS RATE (tons/day):	127.9	127.9	127.9	
VOLUME SAMPLED (cubic feet):	77.543	74.156	74.207	75.302
VOLUME SAMPLED (dry std. cubic feet):	78.770	74.520	73.830	75.707
VOLUME SAMPLED (dry std. cubic meters):	2.231	2.110	2.091	2.144
STACK GAS MOISTURE (percent):	4.16	4.52	4.46	4.38
BAROMETRIC PRESSURE (inches of Hg):	29.91	29.94	29.94	29.93
STATIC PRESSURE (inches of H2O):	-1.3	-1.4	-1.45	-1.38
STACK PRESSURE (inches of Hg):	29.81	29.84	29.83	29.83
STACK TEMPERATURE (degrees F.):	509.5	496.3	500.1	502.0
STACK TEMPERATURE (degrees R.):	969.5	956.3	960.1	962.0
CARBON DIOXIDE (percent):	2.3	2.1	2.3	2.2
OXYGEN (percent):	18.3	17.9	18.0	18.1
CARBON MONOXIDE (ppm):	2	1	NA	
MOLECULAR WEIGHT (dry, lb/lb-mole):	29.10	29.05	29.09	29.08
MOLECULAR WEIGHT (wet, lb/lb-mole):	28.64	28.55	28.59	28.59
AVERAGE VELOCITY HEAD (inches of H2O):	1.603	1.548	1.557	1.569
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	96.87	94.65	95.08	95.53
STACK DIAMETER (inches):	41.5	41.5	41.5	
STACK AREA (square feet):	9.39	9.39	9.39	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	28395.0	28042.5	28073.1	28170.2
DILUTION AIRFLOW (dscf/min):	15550.1	15555.1	15499.7	15535.0
STACK GAS AIRFLOW (actual cubic feet per min.):	54596.5	53344.2	53587.0	53842.6
NOZZLE DIAMETER (inches):	0.202	0.202	0.202	
ISOKINETICS (percent):	98	94	93	95
FRONT-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.020	0.035	0.017	0.024
BACK-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.010	0.009	0.010	0.010
TOTAL PARTICULATE EMISSION CONC. (gr/dscf):	0.029	0.044	0.027	0.033
TOTAL PARTICULATE EMISSION CONC. @ 7% O2 (gr/dscf):	0.155	0.202	0.129	0.162
DILUTION CORRECTED P.M. CONC. (gr/dscf):	0.064	0.098	0.060	0.074
TOTAL PARTICULATE EMISSION CONCENTRATION (mg/dscm):	66.5	99.9	61.7	76.0
PARTICULATE MATTER MASS EMISSION RATE (lb/hr):	7.08	10.5	6.49	8.02

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## SUMMARY OF RESULTS

## 2.1 EPA Method 5 - Particulate Matter

The results of the three (3) 120-minute (2-hour) Method 5 tests for quantifying particulate matter emissions performed at the Oxyfuel Furnace stack on March 24, 1993 are summarized in Table 2.1 below, and on page 5 in a computer printout titled "Summary of Results - Methods 1, 2, 3A, 4, and 5". Oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) data were obtained from six (6) 1-hour Method 3A tests. The results of concurrent gas measurements were averaged for use with the Method 5 data.

**Table 2.1.** Summary of particulate matter emission test results from samples collected on March 24, 1993 at the Oxyfuel Furnace at Ball-InCon Glass Packaging in Seattle, Washington.

# 3

Run #	Front-Half Partic. Matter (gr/dscf)	Back-Half Partic. Matter (gr/dscf)	Total Partic. Matter (gr/dscf)	Dilution Corrected Partic. Matter (gr/dscf)	Total PM Emiss. Rate (lb/hr)
<b>Oxyfuel Furnace</b>					
Run 1	0.019	0.001	0.020	0.045	3.95
Run 2	0.016	0.001	0.017	0.038	3.46
Run 3	0.016	0.001	0.017	0.040	3.41
<b>Average</b>	0.017	0.001	0.018	0.041	3.61

The front-half, back-half, total and dilution corrected particulate matter emission concentrations in Table 2.1 are presented in units of grains per dry standard cubic foot (gr/dscf). The total particulate matter mass emission rate is presented in pounds per hour (lb/hr). An acceptable leak check of less than 0.02 cfm at the highest vacuum rate (or greater) used during the test preceded and followed each run. The average percentage isokinetics for each run were within the acceptable

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 5  
AM TEST-AIR QUALITY, INC.

FILE NAME: 192B\BIM5SUM  
CLIENT: BALL-INCON, INC.  
LOCATION: SEATTLE, WASHINGTON

# 3 OXYFUEL FURNACE STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	3736	3737	3738	
DATE:	3/24/93	3/24/93	3/24/93	
START TIME:	09:06	12:13	14:41	
STOP TIME:	11:06	14:13	16:41	
SAMPLE LENGTH (minutes):	120.0	120.0	120.0	
VOLUME SAMPLED (cubic feet):	75.879	75.955	75.600	75.811
VOLUME SAMPLED (dry std. cubic feet):	77.911	76.600	75.666	76.726
VOLUME SAMPLED (dry std. cubic meters):	2.206	2.169	2.143	2.173
STACK GAS MOISTURE (percent):	5.24	3.65	4.78	4.56
BAROMETRIC PRESSURE (inches of Hg):	29.91	29.94	30.06	29.97
STATIC PRESSURE (inches of H2O):	-0.55	-0.57	-0.54	-0.55
STACK PRESSURE (inches of Hg):	29.87	29.90	30.02	29.93
STACK GAS TEMPERATURE (degrees F.):	319.5	316.6	304.3	313.5
STACK GAS TEMPERATURE (degrees R.):	779.5	776.6	764.3	773.5
CARBON DIOXIDE (percent):	3.5	3.4	3.1	3.3
OXYGEN (percent):	20.1	20.1	20.2	20.1
CARBON MONOXIDE (ppm):	0	0	1	0
MOLECULAR WEIGHT (dry, lb/lb-mole):	29.36	29.35	29.30	29.34
MOLECULAR WEIGHT (wet, lb/lb-mole):	28.77	28.93	28.76	28.82
AVERAGE VELOCITY HEAD (inches of H2O):	0.469	0.479	0.446	0.465
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	46.9	47.1	45.1	46.4
STACK DIAMETER (inches):	48.5	48.5	48.5	
STACK AREA (square feet):	12.8	12.8	12.8	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	23109.2	23716.8	22933.3	23253.1
STACK GAS AIRFLOW (actual cubic feet per min.):	36064.6	36233.9	34747.2	35681.9
NOZZLE DIAMETER (inches):	0.254	0.254	0.254	
ISOKINETICS (percent):	102	98	100	
FRONT-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.019	0.016	0.016	0.017
BACK-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.001	0.001	0.001	0.001
TOTAL PARTICULATE EMISSION CONC. (gr/dscf):	0.020	0.017	0.017	0.018
TOTAL PARTICULATE EMISSION CONC. @ 7% O2 (gr/dscf):	0.347	0.296	0.345	0.329
TOTAL PARTICULATE EMISSION CONC. (mg/dscm):	45.7	39.0	39.7	41.5
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	3.95	3.46	3.41	3.61
TOTAL PART. EMISS. CONC. DILUTION CORR. (gr/dscf):	0.045	0.038	0.040	0.041

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## SUMMARY OF RESULTS

EPA Method 201A samples were collected to quantify the percentage of particulate matter less than (<) 10 microns in diameter (PM<sub>10</sub>) at the exhaust stack from Furnace #4 and Furnace #5 at Ball-InCon. Three (3) PM<sub>10</sub> samples were collected at the Furnace #4 stack on March 23, 1993. Three (3) PM<sub>10</sub> samples were collected at the Furnace #5 stack on March 26, 1993. The results of the six (6) EPA Method 201A tests for quantifying particulate matter and PM<sub>10</sub> emissions from the two (2) sources are summarized in Table 2.0 below, and on pages 5 and 6 in computer printouts titled "Summary of Results - Methods 1, 2, 3A, 4 and 201A".

Table 2.0 Summary of particulate matter emission test results from samples collected at the exhaust stacks of Furnace's #4 and ~~#5~~ at Ball-InCon Glass Packaging in Seattle, Washington on March 23 and 26, 1993.

Sample Run #	Cut Point Dia D <sub>50</sub> (um)	> PM <sub>10</sub> Emission Conc. (gr/dscf)	< PM <sub>10</sub> Emission Conc. w/Cond. (gr/dscf)	Total Emission Conc. w/Cond. (gr/dscf)	Dilution Corrected PM <sub>10</sub> Conc. w/Cond. (gr/dscf)	Percent < PM <sub>10</sub> w/Cond. (%)
<b>Furnace #4</b>						
Run 1	10.13	0.0004	0.010	0.010	0.023	96.0
Run 2	10.24	0.0006	0.011	0.011	0.024	94.5
Run 3	10.19	0.0005	0.024	0.024	0.053	98.1
Average	10.19	0.0005	0.015	0.015	0.033	96.2
<del><b>Furnace #5 Regenerative furnace</b></del>						
<del>Run 2</del>	<del>10.22</del>	<del>0.0004</del>	<del>0.028</del>	<del>0.028</del>	<del>0.050</del>	<del>98.5</del>
<del>Run 3</del>	<del>10.22</del>	<del>0.0003</del>	<del>0.027</del>	<del>0.027</del>	<del>0.050</del>	<del>99.1</del>
<del>Run 4</del>	<del>9.93</del>	<del>0.0001</del>	<del>0.027</del>	<del>0.027</del>	<del>0.052</del>	<del>99.6</del>
<del>Average</del>	<del>10.12</del>	<del>0.0003</del>	<del>0.027</del>	<del>0.027</del>	<del>0.051</del>	<del>99.1</del>

The cut point diameter (D<sub>50</sub>) for each run is presented in units of micrometers, or microns (um). The particulate matter emission concentrations are presented in

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: 192B\BALL#4SM  
 CLIENT: BALL-INCON, INC.  
 LOCATION: SEATTLE, WASHINGTON

FURNACE #4

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	3733	3734	3735	
DATE:	3/23/93	3/23/93	3/23/93	
START TIME:	09:50	12:55	15:42	
STOP TIME:	12:09	15:04	17:56	
SAMPLE LENGTH (minutes):	129.6	121.8	128.1	
VOLUME SAMPLED (cubic feet):	55.174	51.671	54.752	53.866
VOLUME SAMPLED (dry std. cubic feet):	55.307	51.439	54.456	53.734
VOLUME SAMPLED (dry std. cubic meters):	1.566	1.457	1.542	1.522
STACK GAS MOISTURE (percent):	4.59	4.48	4.44	4.50
BAROMETRIC PRESSURE (inches of Hg):	29.88	30.03	30.03	29.98
STATIC PRESSURE (inches of H2O):	-1.3	-1.2	-1.2	-1.2
STACK PRESSURE (inches of Hg):	29.78	29.94	29.94	29.89
STACK GAS TEMPERATURE (degrees F.):	451.5	455.6	449.3	452.1
STACK GAS TEMPERATURE (degrees R.):	911.5	915.6	909.3	912.1
CARBON DIOXIDE (percent):	1.9	2.6	2.3	2.3
OXYGEN (percent):	18.0	17.5	17.7	17.73
CARBON MONOXIDE (ppm):	1	0	0	0.3
MOLECULAR WEIGHT (dry, g/g-mole):	29.02	29.12	29.08	29.1
MOLECULAR WEIGHT (wet, g/g-mole):	28.52	28.62	28.58	28.6
GAS VISCOSITY (micropoises):	272.8	273.7	272.2	272.9
AVERAGE VELOCITY HEAD (inches of H2O):	1.22	1.37	1.39	1.33
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	82.1	87.0	87.4	85.50
STACK DIAMETER (inches):	41.5	41.5	41.5	
STACK AREA (square feet):	9.39	9.39	9.39	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	25449.4	27030.0	27349.2	26609.5
STACK GAS AIRFLOW (actual cubic feet per min.):	46258.2	49037.9	49249.2	48181.8
NOZZLE DIAMETER (inches):	0.180	0.164	0.164	
ISOKINETICS (percent):	89	100	100	
CUT-POINT DIAMETER (D50):	10.13	10.24	10.19	10.19
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0004	0.0006	0.0005	0.0005
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.090	0.142	0.110	0.114
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.009	0.010	0.012	0.010
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	2.04	2.22	2.85	2.37
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.010	0.011	0.024	0.015
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	2.16	2.43	5.53	3.37
< PM10 PARTICULATE MATTER CONC. (DILUTION CORRECTED) (gr/dscf):	0.023	0.024	0.053	0.033
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.010	0.011	0.024	0.015
TOTAL PARTICULATE MATTER CONC. (DILUTION CORRECTED) (gr/dscf):	0.024	0.025	0.054	0.034
TOTAL PARTICULATE MATTER CONCENTRATION @ 7% O2 (gr/dscf):	0.049	0.045	0.105	0.066
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	2.25	2.58	5.64	3.49
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	96.0	94.5	98.1	96.2

Table 2.1 Summary of particulate matter emission test results from samples collected at the exhaust stacks of Furnaces #3 and #5 at Ball-InCon Glass Packaging in Seattle, Washington on March 24-25, 1994.

Sample Run #	Cut Point Dia D <sub>50</sub> (um)	> PM <sub>10</sub> Emission Conc. (gr/dscf)	< PM <sub>10</sub> Emission Conc. w/Cond. (gr/dscf)	Total Emission Conc. w/Cond. (gr/dscf)	Total Emission Rate w/Cond. (lb/hr)	Percent < PM <sub>10</sub> w/Cond. (%)
<b>Furnace #3</b>						
Run 1	9.74	0.0012	0.038	0.039	7.48	97.0
Run 2	9.76	0.0008	0.034	0.035	6.50	97.8
Run 3	9.87	0.0006	0.030	0.030	5.65	98.1
Average	9.79	0.0009	0.034	0.035	6.54	97.6
<b>Furnace #5</b>						
Run 1	9.47	0.0007	0.019	0.020	2.05	96.6
Run 2	9.46	0.00002	0.022	0.022	2.26	99.9
Run 3	9.50	0.0001	0.020	0.020	2.07	99.6
Average	9.48	0.0003	0.020	0.021	2.13	98.7

The cut point diameter (D<sub>50</sub>) for each run is presented in units of micrometers, or microns (um). The particulate matter emission concentrations are presented in units of grains per dry standard cubic foot (gr/dscf). The particulate matter emission concentrations are presented as greater than (>) PM<sub>10</sub>, less than (<) PM<sub>10</sub> with condensibles included, total with condensibles included and percent < PM<sub>10</sub> with condensibles included. "Condensibles" refers to the condensible particulate matter which passes through the filter and condenses in the impingers of the sample train (back-half). The particulate matter emission concentration in units of gr/dscf without condensibles and in milligrams per dry standard cubic meter was also calculated for each run. The emission rate is presented with and without condensibles and total in units of pounds per hour (lb/hr).

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: S708\BALL#3SM  
 CLIENT: BALL-INCON GLASS PACKAGING CORP.  
 LOCATION: SEATTLE, WASHINGTON

FURNACE #3 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	5352	5353	5354	
DATE:	3/24/94	3/24/94	3/24/94	
START TIME:	09:52	12:50	15:32	
STOP TIME:	11:52	14:46	17:30	
SAMPLE LENGTH (minutes):	120.2	116.0	118.2	
VOLUME SAMPLED (cubic feet):	50.968	49.531	49.842	50.114
VOLUME SAMPLED (dry std. cubic feet):	52.910	50.860	51.160	51.643
VOLUME SAMPLED (dry std. cubic meters):	1.498	1.440	1.449	1.462
STACK GAS MOISTURE (percent):	5.60	5.59	5.36	5.52
BAROMETRIC PRESSURE (inches of Hg):	30.15	30.12	30.12	30.13
STATIC PRESSURE (inches of H2O):	-0.51	-0.50	-0.42	-0.48
STACK PRESSURE (inches of Hg):	30.11	30.08	30.09	30.09
STACK GAS TEMPERATURE (degrees F.):	356.6	350.7	346.6	351.3
STACK GAS TEMPERATURE (degrees R.):	816.6	810.7	806.6	811.3
CARBON DIOXIDE (percent):	4.4	4.3	4.2	4.3
OXYGEN (percent):	19.6	19.7	19.8	19.7
CARBON MONOXIDE (ppm):	152	8	3	54
MOLECULAR WEIGHT (dry, g/g-mole):	29.49	29.48	29.46	29.5
MOLECULAR WEIGHT (wet, g/g-mole):	28.84	28.83	28.85	28.8
GAS VISCOSITY (micropoises):	248.0	246.5	245.6	246.7
AVERAGE VELOCITY HEAD (inches of H2O):	0.460	0.440	0.431	0.444
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	47.2	46.0	45.4	46.20
STACK DIAMETER (inches):	48.5	48.5	48.5	
STACK AREA (square feet):	12.8	12.8	12.8	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	22320.1	21910.9	21795.1	22008.7
STACK GAS AIRFLOW (actual cubic feet per min.):	36334.2	35440.4	34983.9	35586.2
NOZZLE DIAMETER (inches):	0.210	0.210	0.210	
ISOKINETICS (percent):	105	107	106	
CUT-POINT DIAMETER (D50):	9.74	9.76	9.87	9.79
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0012	0.0008	0.0006	0.0009
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.221	0.145	0.109	0.158
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.030	0.032	0.027	0.030
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	5.69	6.08	5.10	5.62
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.038	0.034	0.030	0.034
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	7.26	6.36	5.54	6.39
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.039	0.035	0.030	0.035
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	89.5	79.2	69.2	79.3
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	7.48	6.50	5.65	6.54
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	96.3	97.7	97.9	97.3
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	97.0	97.8	98.1	97.6

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: S708\BALL#5SM  
CLIENT: BALL-INCON GLASS PACKAGING CORP.  
LOCATION: SEATTLE, WASHINGTON

FURNACE #5 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	5355	5356	5357	
DATE:	3/25/94	3/25/94	3/25/94	
START TIME:	09:43	12:36	15:20	
STOP TIME:	11:46	14:38	17:23	
SAMPLE LENGTH (minutes):	122.6	122.3	123.2	
VOLUME SAMPLED (cubic feet):	55.324	56.085	55.614	55.674
VOLUME SAMPLED (dry std. cubic feet):	55.889	55.652	55.704	55.748
VOLUME SAMPLED (dry std. cubic meters):	1.583	1.576	1.578	1.579
STACK GAS MOISTURE (percent):	7.00	7.33	7.33	7.22
BAROMETRIC PRESSURE (inches of Hg):	30.21	30.18	30.18	30.19
STATIC PRESSURE (inches of H2O):	-0.35	-0.31	-0.33	-0.33
STACK PRESSURE (inches of Hg):	30.18	30.16	30.16	30.17
STACK GAS TEMPERATURE (degrees F.):	409.3	418.1	414.3	413.9
STACK GAS TEMPERATURE (degrees R.):	869.3	878.1	874.3	873.9
CARBON DIOXIDE (percent):	4.6	4.2	4.4	4.4
OXYGEN (percent):	19.7	19.8	19.8	19.8
CARBON MONOXIDE (ppm):	6	4	5	5
MOLECULAR WEIGHT (dry, g/g-mole):	29.52	29.46	29.50	29.5
MOLECULAR WEIGHT (wet, g/g-mole):	28.72	28.62	28.65	28.7
GAS VISCOSITY (micropoises):	260.8	262.9	261.9	261.9
AVERAGE VELOCITY HEAD (inches of H2O):	0.274	0.273	0.282	0.276
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	37.7	37.8	38.3	37.9
STACK DIAMETER (inches):	41.5	41.5	41.5	
STACK AREA (square feet):	9.39	9.39	9.39	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	12098.6	11971.6	12183.8	12084.7
STACK GAS AIRFLOW (actual cubic feet per min.):	21231.5	21315.7	21602.0	21383.1
NOZZLE DIAMETER (inches):	0.240	0.240	0.240	
ISOKINETICS (percent):	113	114	111	
CUT-POINT DIAMETER (D50):	9.47	9.46	9.50	9.48
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0007	0.00002	0.0001	0.0003
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.070	0.002	0.008	0.027
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.014	0.017	0.017	0.016
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	1.40	1.73	1.80	1.64
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.019	0.022	0.020	0.020
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	1.98	2.26	2.06	2.10
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.020	0.022	0.020	0.021
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	45.1	50.4	45.3	46.9
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	2.05	2.26	2.07	2.13
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	95.2	99.9	99.6	98.2
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	96.6	99.9	99.6	98.7

**Table 2.1** Summary of particulate matter emission test results from samples collected at the exhaust stacks of Furnaces #2, #3, #4 and #5 at Ball Glass Container Corporation in Seattle, Washington on May 17-20, 1994.

Sample Run #	Cut Point Diam D <sub>50</sub> (um)	> PM <sub>10</sub> Emission Conc. (gr/dscf)	< PM <sub>10</sub> Emission Conc. w/Cond. (gr/dscf)	Total Emission Conc. w/Cond. (gr/dscf)	< PM <sub>10</sub> Emission Rate w/Cond. (lb/hr)	Percent < PM <sub>10</sub> w/Cond. (%)
<b>Furnace #2 (South)</b>						
Run 1	9.63	0.0009	0.038	0.039	1.68	97.7
Run 2	9.68	0.0008	0.028	0.028	1.23	97.1
Run 3	10.01	0.0005	0.031	0.032	1.34	98.4
<b>Average</b>	9.77	0.0007	0.032	0.033	1.42	97.7
<b>Furnace #2 (North)</b>						
Run 1	10.09	0.0006	0.028	0.029	1.43	98.0
Run 2	10.18	0.0000	0.022	0.022	1.08	100.0
Run 3	10.23	0.0003	0.022	0.022	1.12	98.7
<b>Average</b>	10.17	0.0003	0.024	0.024	1.21	98.9
<b>Furnace #2 (Avg)</b>		0.0005	0.028	0.029		98.3
<b>Furnace #2 (Total)</b>					2.63	
<b>Furnace #3</b>						
Run 1	9.93	0.0002	0.025	0.025	4.59	99.2
Run 2	10.14	0.0009	0.024	0.025	4.43	96.6
Run 3	10.24	0.0007	0.017	0.017	3.12	96.2
<b>Average</b>	10.10	0.0006	0.022	0.022	4.05	97.3
<b>Furnace #4</b>						
Run 1	10.03	0.011	0.043*	0.065*	3.07	65.6
Run 2	9.99	0.024	0.052*	0.105*	4.73	50.1
Run 3	10.12	0.007	0.058*	0.071*	6.10	82.1
<b>Average</b>	10.05	0.014	0.051*	0.080*	4.63	65.9
*Dilution Corrected						
<b>Furnace #5</b>						
Run 1	10.04	0.0009	0.026	0.027	2.76	96.7
Run 2	10.27	0.002	0.025	0.027	2.57	91.4
Run 3	10.22	0.001	0.022	0.023	2.26	94.6
<b>Average</b>	10.18	0.001	0.024	0.026	2.53	94.2

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: S708\BALLS2SM  
CLIENT: Ball Glass Container Corporation  
LOCATION: Seattle, Washington

FURNACE #2 SOUTH STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	5739	5740	5741	
DATE:	5/17/94	5/17/94	5/17/94	
START TIME:	09:45	13:38	17:03	
STOP TIME:	11:47	15:53	19:15	
SAMPLE LENGTH (minutes):	110.96	118.55	115.73	
VOLUME SAMPLED (cubic feet):	49.902	52.883	49.293	50.693
VOLUME SAMPLED (dry std. cubic feet):	49.064	52.068	48.260	49.797
VOLUME SAMPLED (dry std. cubic meters):	1.390	1.475	1.367	1.411
STACK GAS MOISTURE (percent):	9.94	9.70	9.97	9.87
BAROMETRIC PRESSURE (inches of Hg):	29.95	29.95	29.95	29.95
STATIC PRESSURE (inches of H2O):	-0.25	-0.29	-0.30	-0.28
STACK PRESSURE (inches of Hg):	29.93	29.93	29.93	29.93
STACK GAS TEMPERATURE (degrees F.):	603.6	587.3	585.2	592.0
STACK GAS TEMPERATURE (degrees R.):	1063.6	1047.3	1045.2	1052.0
CARBON DIOXIDE (percent):	7.5	7.2	7.4	7.4
OXYGEN (percent):	18.9	19.0	19.0	19.0
CARBON MONOXIDE (ppm):	229.8	8.9	3.5	80.7
MOLECULAR WEIGHT (dry, g/g-mole):	29.96	29.91	29.94	29.9
MOLECULAR WEIGHT (wet, g/g-mole):	28.77	28.76	28.75	28.8
GAS VISCOSITY (micropoises):	310.5	306.3	305.5	307.4
AVERAGE VELOCITY HEAD (inches of H2O):	0.270	0.265	0.249	0.261
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	41.5	40.8	39.5	40.60
STACK DIAMETER (inches):	29.25	29.25	29.25	
STACK AREA (square-feet):	4.67	4.67	4.67	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	5191.7	5200.9	5032.5	5141.7
STACK GAS AIRFLOW (actual cubic feet per min.):	11607.3	11420.6	11062.5	11363.5
NOZZLE DIAMETER (inches):	0.264	0.264	0.264	
ISOKINETICS (percent):	105	104	102	
CUT-POINT DIAMETER (D50):	9.63	9.68	10.01	9.77
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0009	0.0008	0.0005	0.0007
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.039	0.037	0.022	0.033
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.028	0.023	0.025	0.025
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	1.24	1.01	1.07	1.11
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.038	0.028	0.031	0.032
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	1.68	1.23	1.34	1.42
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.039	0.028	0.032	0.033
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	88.2	65.0	72.5	75.2
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	1.72	1.27	1.37	1.45
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	96.9	96.5	98.0	97.1
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	97.7	97.1	98.4	97.7

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: S708\BALLN2SM  
CLIENT: Ball Glass Container Corporation  
LOCATION: Seattle, Washington

FURNACE #2 NORTH STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	5736	5737	5738	
DATE:	5/17/94	5/17/94	5/17/94	
START TIME:	09:45	13:38	17:03	
STOP TIME:	12:02	15:53	19:13	
SAMPLE LENGTH (minutes):	124.8	118.7	122.4	
VOLUME SAMPLED (cubic feet):	51.741	49.482	50.919	50.714
VOLUME SAMPLED (dry std. cubic feet):	51.830	48.707	49.760	50.099
VOLUME SAMPLED (dry std. cubic meters):	1.468	1.379	1.409	1.419
STACK GAS MOISTURE (percent):	8.09	7.73	7.88	7.90
BAROMETRIC PRESSURE (inches of Hg):	29.95	29.95	29.95	29.95
STATIC PRESSURE (inches of H <sub>2</sub> O):	-0.30	-0.30	-0.30	-0.30
STACK PRESSURE (inches of Hg):	29.93	29.93	29.93	29.93
STACK GAS TEMPERATURE (degrees F.):	492.2	471.9	471.4	478.5
STACK GAS TEMPERATURE (degrees R.):	952.2	931.9	931.4	938.5
CARBON DIOXIDE (percent):	4.6	4.2	4.3	4.4
OXYGEN (percent):	18.9	19.1	19.2	19.1
CARBON MONOXIDE (ppm):	159.7	4.1	0.2	54.7
MOLECULAR WEIGHT (dry, g/g-mole):	29.49	29.44	29.46	29.5
MOLECULAR WEIGHT (wet, g/g-mole):	28.56	28.55	28.55	28.6
GAS VISCOSITY (micropoises):	281.6	276.5	276.3	278.1
AVERAGE VELOCITY HEAD (inches of H <sub>2</sub> O):	0.297	0.287	0.297	0.294
PITOT TUBE C <sub>p</sub> :	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	41.3	40.2	40.9	40.80
STACK DIAMETER (inches):	29.25	29.25	29.25	
STACK AREA (square feet):	4.67	4.67	4.67	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	5894.3	5884.1	5978.6	5919.0
STACK GAS AIRFLOW (actual cubic feet per min.):	11563.0	11253.0	11445.3	11420.4
NOZZLE DIAMETER (inches):	0.233	0.233	0.233	
ISOKINETICS (percent):	111	110	107	
CUT-POINT DIAMETER (D50):	10.09	10.18	10.23	10.17
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0006	0.0000	0.0003	0.0003
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.029	0.000	0.014	0.014
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.022	0.019	0.018	0.020
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	1.11	0.944	0.918	0.991
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.028	0.022	0.022	0.024
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	1.43	1.08	1.12	1.21
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.029	0.022	0.022	0.024
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	66.2	49.2	50.8	55.4
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	1.46	1.08	1.14	1.23
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	97.5	100.0	98.5	98.7
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	98.0	100.0	98.7	98.9

# AMTEST

AIR QUALITY, INC

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: S708\BALL3SM  
CLIENT: Ball Glass Container Corporation  
LOCATION: Seattle, Washington

## FURNACE #3 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	5742	5743	5744	
DATE:	5/18/94	5/18/94	5/18/94	
START TIME:	09:35	12:25	15:05	
STOP TIME:	11:36	14:25	17:04	
SAMPLE LENGTH (minutes):	121.1	117.8	118.8	
VOLUME SAMPLED (cubic feet):	50.381	48.843	49.432	49.552
VOLUME SAMPLED (dry std. cubic feet):	51.215	48.979	49.614	49.936
VOLUME SAMPLED (dry std. cubic meters):	1.450	1.387	1.405	1.414
STACK GAS MOISTURE (percent):	6.50	5.46	4.00	5.32
BAROMETRIC PRESSURE (inches of Hg):	30.10	30.10	30.10	30.10
STATIC PRESSURE (inches of H2O):	-0.30	-0.32	-0.38	-0.33
STACK PRESSURE (inches of Hg):	30.08	30.08	30.07	30.08
STACK GAS TEMPERATURE (degrees F.):	325.1	322.5	323.7	323.8
STACK GAS TEMPERATURE (degrees R.):	785.1	782.5	783.7	783.8
CARBON DIOXIDE (percent):	2.4	2.3	2.3	2.3
OXYGEN (percent):	20.2	20.3	20.3	20.3
CARBON MONOXIDE (ppm):	0.1	0.1	0.0	0.1
MOLECULAR WEIGHT (dry, g/g-mole):	29.19	29.18	29.18	29.2
MOLECULAR WEIGHT (wet, g/g-mole):	28.46	28.57	28.73	28.6
GAS VISCOSITY (micropoises):	239.4	239.6	241.0	240.0
AVERAGE VELOCITY HEAD (inches of H2O):	0.416	0.402	0.408	0.409
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	44.3	43.5	43.7	43.83
STACK DIAMETER (inches):	48.5	48.5	48.5	
STACK AREA (square feet):	12.8	12.8	12.8	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	21572.8	21454.5	21870.5	21632.6
STACK GAS AIRFLOW (actual cubic feet per min.):	34126.1	33457.3	33645.7	33743.0
NOZZLE DIAMETER (inches):	0.197	0.197	0.197	
ISOKINETICS (percent):	119	118	116	
CUT-POINT DIAMETER (D50):	9.93	10.14	10.24	10.10
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0002	0.0009	0.0007	0.0006
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.039	0.156	0.122	0.106
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.021	0.020	0.014	0.018
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	3.89	3.63	2.71	3.41
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.025	0.024	0.017	0.022
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	4.59	4.43	3.12	4.05
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.025	0.025	0.017	0.022
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	57.3	57.1	39.6	51.3
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	4.63	4.59	3.24	4.15
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	99.0	95.9	95.7	96.9
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	99.2	96.6	96.2	97.3

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: S708\BALL4SM  
CLIENT: Ball Glass Container Corporation  
LOCATION: Seattle, Washington

FURNACE #4 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	5745	5746	5747	
DATE:	5/19/94	5/19/94	5/19/94	
START TIME:	09:35	12:45	16:03	
STOP TIME:	12:07	15:13	18:30	
SAMPLE LENGTH (minutes):	137.04	135.85	124.03	
DILUTION AIRFLOW (dscf/min):	9251.9	12092.8	11583.4	
VOLUME SAMPLED (cubic feet):	57.930	58.656	53.352	56.646
VOLUME SAMPLED (dry std. cubic feet):	58.117	57.991	52.005	56.038
VOLUME SAMPLED (dry std. cubic meters):	1.646	1.642	1.473	1.587
STACK GAS MOISTURE (percent):	5.21	5.49	5.51	5.40
BAROMETRIC PRESSURE (inches of Hg):	30.00	30.05	30.05	30.03
STATIC PRESSURE (inches of H2O):	-0.51	-0.70	-0.85	-0.69
STACK PRESSURE (inches of Hg):	29.96	30.00	29.99	29.98
STACK GAS TEMPERATURE (degrees F.):	374.8	398.8	405.2	392.9
STACK GAS TEMPERATURE (degrees R.):	834.8	858.8	865.2	852.9
CARBON DIOXIDE (percent):	2.3	2.6	2.8	2.6
OXYGEN (percent):	17.4	16.7	16.5	16.9
CARBON MONOXIDE (ppm):	0.1	0.1	0.1	0.1
MOLECULAR WEIGHT (dry, g/g-mole):	29.06	29.08	29.11	29.1
MOLECULAR WEIGHT (wet, g/g-mole):	28.49	28.48	28.50	28.5
GAS VISCOSITY (micropoises):	251.8	257.5	259.1	256.1
AVERAGE VELOCITY HEAD (inches of H2O):	0.610	1.035	1.154	0.933
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	55.5	73.3	77.6	68.80
STACK DIAMETER (inches):	40.25	40.25	40.25	
STACK AREA (square feet):	8.84	8.84	8.84	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	17650.0	22627.2	23788.6	21355.3
STACK GAS AIRFLOW (actual cubic feet per min.):	29400.1	38835.9	41158.8	36464.9
NOZZLE DIAMETER (inches):	0.215	0.197	0.150	
ISOKINETICS (percent):	84	79	127	
CUT-POINT DIAMETER (D50):	10.03	9.99	10.12	10.05
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.011	0.024	0.007	0.014
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	1.61	4.71	1.33	2.55
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.012	0.018	0.021	0.017
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	1.86	3.58	4.21	3.22
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.020	0.024	0.030	0.025
< PM10 PM CONC. W/CONDENSIBLES (Dilution Corrected, gr/dscf):	0.043	0.052	0.058	0.051
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	3.07	4.73	6.10	4.63
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.031	0.049	0.036	0.039
TOTAL PARTICULATE MATTER CONC. (Dilution Corrected, gr/dscf):	0.065	0.105	0.071	0.080
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	70.8	111.4	83.4	88.5
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	4.68	9.44	7.43	7.18
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	53.5	43.2	76.0	57.6
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	65.6	50.1	82.1	65.9

# AMTEST

AIR QUALITY, INC.

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: S708\BALL5SM  
CLIENT: Ball Glass Container Corporation  
LOCATION: Seattle, Washington

FURNACE #5 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	5748	5749	5750	
DATE:	5/20/94	5/20/94	5/20/94	
START TIME:	10:23	13:22	16:05	
STOP TIME:	12:32	15:25	18:10	
SAMPLE LENGTH (minutes):	119.84	116.90	114.20	
VOLUME SAMPLED (cubic feet):	48.947	46.687	45.984	47.206
VOLUME SAMPLED (dry std. cubic feet):	49.887	47.261	46.399	47.849
VOLUME SAMPLED (dry std. cubic meters):	1.413	1.338	1.314	1.355
STACK GAS MOISTURE (percent):	7.41	7.31	7.47	7.40
BAROMETRIC PRESSURE (inches of Hg):	30.00	30.00	30.00	30.00
STATIC PRESSURE (inches of H2O):	-0.25	-0.24	-0.25	-0.25
STACK PRESSURE (inches of Hg):	29.98	29.98	29.98	29.98
STACK GAS TEMPERATURE (degrees F.):	428.5	434.9	431.3	431.6
STACK GAS TEMPERATURE (degrees R.):	888.5	894.9	891.3	891.6
CARBON DIOXIDE (percent):	5.6	5.3	5.2	5.4
OXYGEN (percent):	19.4	19.6	19.6	19.5
CARBON MONOXIDE (ppm):	2.9	2.8	3.1	2.9
MOLECULAR WEIGHT (dry, g/g-mole):	29.67	29.63	29.62	29.6
MOLECULAR WEIGHT (wet, g/g-mole):	28.81	28.78	28.75	28.8
GAS VISCOSITY (micropoises):	265.4	267.2	266.2	266.3
AVERAGE VELOCITY HEAD (inches of H2O):	0.304	0.292	0.275	0.290
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	40.1	39.5	38.3	39.30
STACK DIAMETER (inches):	41.5	41.5	41.5	
STACK AREA (square feet):	9.39	9.39	9.39	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	12473.4	12210.2	11865.3	12183.0
STACK GAS AIRFLOW (actual cubic feet per min.):	22624.6	22280.0	21599.9	22168.2
NOZZLE DIAMETER (inches):	0.215	0.233	0.233	
ISOKINETICS (percent):	124	105	109	
CUT-POINT DIAMETER (D50):	10.04	10.27	10.22	10.18
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0009	0.002	0.001	0.001
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.093	0.242	0.129	0.155
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.021	0.021	0.020	0.021
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	2.24	2.23	2.07	2.18
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.026	0.025	0.022	0.024
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	2.76	2.57	2.26	2.53
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.027	0.027	0.023	0.026
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	61.1	61.4	53.7	58.7
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	2.86	2.81	2.39	2.69
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	96.0	90.2	94.1	93.4
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	96.7	91.4	94.6	94.2

Table 2.0 Summary of particulate matter emission test results from samples collected at the exhaust stacks of Furnaces #2, #3, #4, and #5 at Ball Glass Container Corporation in Seattle, Washington on June 13-16, 1995.

Sample Run #	Cut Point Diam D <sub>50</sub> (µm)	> PM <sub>10</sub> Emission Conc. (gr/dscf)	< PM <sub>10</sub> Emission Conc. w/Cond. (gr/dscf)	Total Emission Conc. w/Cond. (gr/dscf)	Total Emission Rate w/Cond. (lb/hr)	Percent < PM10 w/Cond. (%)
<b>Furnace #2 (North)</b>						
Run 1	10.51	0.0006	0.039	0.039	2.03	98.4
Run 2	10.63	0.0008	0.027	0.028	1.50	97.3
Run 3	10.68	0.0014	0.035	0.036	1.88	96.0
Average	10.61	0.0009	0.034	0.034	1.80	97.2
<b>Furnace #2 (South)</b>						
Run 1	10.36	0.0007	0.054	0.055	2.18	98.8
Run 2	10.17	0.0007	0.040	0.041	1.62	98.3
Run 3	10.23	0.0003	0.037	0.038	1.52	99.3
Average	10.25	0.0006	0.044	0.045	1.77	98.8
<b>Furnace #2 Average</b>		0.0008	0.039	0.040		98.0
<b>Furnace #2 Total</b>					3.57	
<b>Furnace #3</b>						
Run 1	10.04	0.0001	0.041	0.041	7.32	99.7
Run 2	10.16	0.0000	0.030	0.030	5.40	100.0
Run 3	10.30	0.0001	0.030	0.030	5.49	99.7
Average	10.17	0.0001	0.034	0.034	6.07	99.8
<b>Furnace #4</b>						
Run 1	10.51	0.0003	0.068 *	0.068 *	3.21	99.0
Run 2	10.63	0.0004	0.068 *	0.069 *	3.47	98.6
Run 3	10.68	0.0007	0.058 *	0.060 *	3.24	97.4
Average	10.61	0.0005	0.065 *	0.066 *	3.31	98.3
*Dilution Corrected						
<b>Furnace #5</b>						
Run 1	10.51	0.0006	0.010	0.010	1.57	94.1
Run 2	10.75	0.00004	0.008	0.008	1.29	99.6
Run 3	10.75	0.0003	0.008	0.008	1.16	95.9
Average	10.67	0.0003	0.009	0.009	1.34	96.5

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: DG113\BAL2NSUM  
CLIENT: Ball Glass Container Corporation  
LOCATION: Seattle, Washington

NORTH FURNACE #2 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	8317	8318	8319	
DATE:	6/13/95	6/13/95	6/13/95	
START TIME:	0730	1035	1347	
STOP TIME:	0937	1240	1546	
SAMPLE LENGTH (minutes):	122.9	121.3	117.3	
VOLUME SAMPLED (cubic feet):	48.541	48.441	46.860	47.947
VOLUME SAMPLED (dry std. cubic feet):	49.007	47.522	45.561	47.363
VOLUME SAMPLED (dry std. cubic meters):	1.388	1.346	1.290	1.341
STACK GAS MOISTURE (percent):	7.52	7.57	7.54	7.54
BAROMETRIC PRESSURE (inches of Hg):	30.10	30.05	30.00	30.05
STATIC PRESSURE (inches of H2O):	-0.25	-0.25	-0.25	-0.25
STACK PRESSURE (inches of Hg):	30.08	30.03	29.98	30.03
STACK GAS TEMPERATURE (degrees F.):	516.3	516.4	511.0	514.6
STACK GAS TEMPERATURE (degrees R.):	976.3	976.4	971.0	974.6
CARBON DIOXIDE (percent):	4.4	4.3	4.5	4.4
OXYGEN (percent):	19.7	19.7	19.6	19.7
MOLECULAR WEIGHT (dry, g/g-mole):	29.49	29.48	29.50	29.49
MOLECULAR WEIGHT (wet, g/g-mole):	28.63	28.61	28.64	28.63
GAS VISCOSITY (micropoises):	288.9	288.9	287.4	288.4
AVERAGE VELOCITY HEAD (inches of H2O):	0.311	0.333	0.321	0.322
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	42.7	44.2	43.4	43.4
STACK DIAMETER (inches):	29.25	29.25	29.25	
STACK AREA (square feet):	4.67	4.67	4.67	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	6007.5	6201.4	6106.4	6105.1
STACK GAS AIRFLOW (actual cubic feet per min.):	11946	12362	12121	12143
NOZZLE DIAMETER (inches):	0.233	0.233	0.233	
ISOKINETICS (percent):	105	100	100	
CUT-POINT DIAMETER (D50) (microns):	10.51	10.63	10.68	10.61
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0006	0.0008	0.0014	0.0009
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.032	0.041	0.075	0.049
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.028	0.026	0.026	0.027
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	1.43	1.38	1.36	1.39
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.039	0.027	0.035	0.034
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	2.00	1.46	1.81	1.76
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.039	0.028	0.036	0.034
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	90.1	64.6	82.2	79.0
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	2.03	1.50	1.88	1.80
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	97.8	97.1	94.8	96.6
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	98.4	97.3	96.0	97.2

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: DG113\BAL2SSUM  
 CLIENT: Ball Glass Container Corporation  
 LOCATION: Seattle, Washington

SOUTH FURNACE #2 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	8314	8315	8316	
DATE:	6/13/95	6/13/95	6/13/95	
START TIME:	0730	1032	1346	
STOP TIME:	0934	1239	1558	
SAMPLE LENGTH (minutes):	118.3	119.3	116.8	
VOLUME SAMPLED (cubic feet):	47.054	49.394	48.004	48.151
VOLUME SAMPLED (dry std. cubic feet):	48.033	49.963	48.276	48.757
VOLUME SAMPLED (dry std. cubic meters):	1.360	1.415	1.367	1.381
STACK GAS MOISTURE (percent):	9.21	9.35	9.86	9.47
BAROMETRIC PRESSURE (inches of Hg):	30.15	30.30	30.30	30.25
STATIC PRESSURE (inches of H2O):	-0.25	-0.25	-0.25	-0.25
STACK PRESSURE (inches of Hg):	30.13	30.28	30.28	30.23
STACK GAS TEMPERATURE (degrees F.):	618.0	627.5	633.3	626.3
STACK GAS TEMPERATURE (degrees R.):	1078.0	1087.5	1093.3	1086.3
CARBON DIOXIDE (percent):	6.7	7.0	6.8	6.8
OXYGEN (percent):	19.1	19.1	19.2	19.1
MOLECULAR WEIGHT (dry, g/g-mole):	29.84	29.88	29.86	29.86
MOLECULAR WEIGHT (wet, g/g-mole):	28.75	28.77	28.69	28.74
GAS VISCOSITY (micropoises):	315.2	317.7	319.0	317.3
AVERAGE VELOCITY HEAD (inches of H2O):	0.211	0.215	0.224	0.217
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	36.8	37.2	38.1	37.4
STACK DIAMETER (inches):	29.25	29.25	29.25	
STACK AREA (square feet):	4.67	4.67	4.67	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	4617.4	4641.6	4702.5	4653.8
STACK GAS AIRFLOW (actual cubic feet per min.):	10311	10420	10674	10468
NOZZLE DIAMETER (inches):	0.264	0.264	0.264	
ISOKINETICS (percent):	108	111	108	
CUT-POINT DIAMETER (D50) (microns):	10.36	10.17	10.23	10.25
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0007	0.0007	0.0003	0.0006
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.026	0.027	0.011	0.021
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.037	0.033	0.036	0.035
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	1.46	1.32	1.44	1.41
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.054	0.040	0.037	0.044
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	2.15	1.59	1.51	1.75
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.055	0.041	0.038	0.045
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	125.9	93.1	86.3	101.8
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	2.18	1.62	1.52	1.77
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	98.2	98.0	99.2	98.5
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	98.8	98.3	99.3	98.8

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: DG113\BALL3SUM  
CLIENT: Ball Glass Container Corporation  
LOCATION: Seattle, Washington

FURNACE #3 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	8338	8339	8340	
DATE:	6/14/95	6/14/95	6/14/95	
START TIME:	0809	1046	1319	
STOP TIME:	1013	1248	1522	
SAMPLE LENGTH (minutes):	122.3	121.6	121.4	
VOLUME SAMPLED (cubic feet):	50.922	50.285	49.783	50.330
VOLUME SAMPLED (dry std. cubic feet):	52.082	50.887	49.971	50.980
VOLUME SAMPLED (dry std. cubic meters):	1.475	1.441	1.415	1.444
STACK GAS MOISTURE (percent):	6.37	6.40	6.15	6.31
BAROMETRIC PRESSURE (inches of Hg):	29.95	29.90	29.90	29.92
STATIC PRESSURE (inches of H2O):	-0.35	-0.35	-0.35	-0.35
STACK PRESSURE (inches of Hg):	29.92	29.87	29.87	29.89
STACK GAS TEMPERATURE (degrees F.):	471.3	474.2	478.1	474.5
STACK GAS TEMPERATURE (degrees R.):	931.3	934.2	938.1	934.5
CARBON DIOXIDE (percent):	3.6	3.5	3.9	3.7
OXYGEN (percent):	19.4	19.5	19.4	19.4
MOLECULAR WEIGHT (dry, g/g-mole):	29.35	29.34	29.40	29.36
MOLECULAR WEIGHT (wet, g/g-mole):	28.63	28.61	28.70	28.65
GAS VISCOSITY (micropoises):	277.5	278.3	279.5	278.4
AVERAGE VELOCITY HEAD (inches of H2O):	0.468	0.487	0.484	0.480
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	51.2	52.4	52.2	51.9
STACK DIAMETER (inches):	48.5	48.5	48.5	
STACK AREA (square feet):	12.8	12.8	12.8	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	20926	21310	21212	21149
STACK GAS AIRFLOW (actual cubic feet per min.):	39415	40344	40220	39993
NOZZLE DIAMETER (inches):	0.215	0.215	0.215	
ISOKINETICS (percent):	104	100	99	
CUT-POINT DIAMETER (D50) (microns):	10.04	10.16	10.30	10.17
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0001	0.0000	0.0001	0.0001
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.022	0.000	0.017	0.013
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.030	0.029	0.029	0.029
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	5.45	5.33	5.33	5.37
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.041	0.030	0.030	0.034
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	7.30	5.41	5.47	6.06
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.041	0.030	0.030	0.034
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	93.4	67.8	69.1	76.8
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	7.32	5.41	5.49	6.07
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	99.6	100.0	99.7	99.8
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	99.7	100.0	99.7	99.8

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: DG113\BALL4SUM  
 CLIENT: Ball Glass Container Corporation  
 LOCATION: Seattle, Washington

FURNACE #4 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
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LAB #:	8350	8351	8352	
DATE:	6/16/95	6/16/95	6/16/95	
START TIME:	0757	1022	1306	
STOP TIME:	0952	1237	1514	
SAMPLE LENGTH (minutes):	108.8	128.5	122.4	
DILUTION AIRFLOW (dscf/min):	7765.3	8496.9	8346.4	
VOLUME SAMPLED (cubic feet):	45.501	52.851	51.426	49.926
VOLUME SAMPLED (dry std. cubic feet):	45.785	52.507	50.696	49.663
VOLUME SAMPLED (dry std. cubic meters):	1.297	1.487	1.436	1.407
STACK GAS MOISTURE (percent):	6.25	6.32	6.13	6.23
BAROMETRIC PRESSURE (inches of Hg):	29.90	29.90	29.90	29.90
STATIC PRESSURE (inches of H <sub>2</sub> O):	-0.33	-0.34	-0.32	-0.33
STACK PRESSURE (inches of Hg):	29.88	29.88	29.88	29.88
STACK GAS TEMPERATURE (degrees F.):	431.3	426.6	425.8	427.9
STACK GAS TEMPERATURE (degrees R.):	891.3	886.6	885.8	887.9
CARBON DIOXIDE (percent):	2.3	2.4	2.4	2.4
OXYGEN (percent):	17.4	17.2	17.5	17.4
MOLECULAR WEIGHT (dry, g/g-mole):	29.06	29.07	29.08	29.07
MOLECULAR WEIGHT (wet, g/g-mole):	28.37	28.37	28.40	28.38
GAS VISCOSITY (micropoises):	265.9	264.5	264.6	265.0
AVERAGE VELOCITY HEAD (inches of H <sub>2</sub> O):	0.375	0.437	0.456	0.423
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	45.1	48.6	49.5	47.7
STACK DIAMETER (inches):	40.25	40.25	40.25	
STACK AREA (square feet):	8.84	8.84	8.84	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	13255	14347	14676	14093
STACK GAS AIRFLOW (actual cubic feet per min.):	23899	25754	26267	25307
NOZZLE DIAMETER (inches):	0.215	0.215	0.215	
ISOKINETICS (percent):	111	100	99	
CUT-POINT DIAMETER (D50) (microns):	10.06	10.26	10.18	10.17
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0003	0.0004	0.0007	0.0005
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.033	0.050	0.084	0.056
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.027	0.027	0.025	0.026
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	3.02	3.32	3.14	3.16
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.028	0.028	0.025	0.027
< PM10 PM CONC. W/CONDENSIBLES (Dilution Corrected, gr/dscf):	0.068	0.068	0.058	0.065
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	3.18	3.42	3.16	3.25
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.028	0.028	0.026	0.027
TOTAL PARTICULATE MATTER CONC. (Dilution Corrected, gr/dscf):	0.068	0.069	0.060	0.066
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	64.6	64.6	58.9	62.7
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	3.21	3.47	3.24	3.31
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	98.9	98.5	97.4	98.3
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	99.0	98.6	97.4	98.3

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 201A  
AM TEST - AIR QUALITY, INC.

FILE NAME: DG113\BALL5SUM  
CLIENT: Ball Glass Container Corporation  
LOCATION: Seattle, Washington

FURNACE #5 STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
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LAB #:	8347	8348	8349	
DATE:	6/15/95	6/15/95	6/15/95	
START TIME:	0814	1051	1333	
STOP TIME:	1027	1257	1532	
SAMPLE LENGTH (minutes):	121.4	119.4	116.5	
VOLUME SAMPLED (cubic feet):	47.534	46.427	46.637	46.866
VOLUME SAMPLED (dry std. cubic feet):	48.087	45.827	45.035	46.316
VOLUME SAMPLED (dry std. cubic meters):	1.362	1.298	1.275	1.312
STACK GAS MOISTURE (percent):	4.49	4.60	3.92	4.34
BAROMETRIC PRESSURE (inches of Hg):	29.85	29.90	29.85	29.87
STATIC PRESSURE (inches of H2O):	-0.29	-0.28	-0.29	-0.29
STACK PRESSURE (inches of Hg):	29.83	29.88	29.83	29.85
STACK GAS TEMPERATURE (degrees F.):	295.8	293.2	293.5	294.2
STACK GAS TEMPERATURE (degrees R.):	755.8	753.2	753.5	754.2
CARBON DIOXIDE (percent):	1.9	1.8	1.7	1.8
OXYGEN (percent):	20.4	20.5	20.5	20.5
MOLECULAR WEIGHT (dry, g/g-mole):	29.12	29.11	29.09	29.1
MOLECULAR WEIGHT (wet, g/g-mole):	28.62	28.60	28.66	28.6
GAS VISCOSITY (micropoises):	233.5	232.8	233.4	233.2
AVERAGE VELOCITY HEAD (inches of H2O):	0.499	0.493	0.456	0.483
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	47.8	47.4	45.5	46.9
STACK DIAMETER (inches):	41.5	41.5	41.5	
STACK AREA (square feet):	9.39	9.39	9.39	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	17902	17824	17215	17647
STACK GAS AIRFLOW (actual cubic feet per min.):	26913	26690	25650	26418
NOZZLE DIAMETER (inches):	0.215	0.197	0.197	
ISOKINETICS (percent):	82	96	100	
CUT-POINT DIAMETER (D50) (microns):	10.51	10.75	10.75	10.67
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0006	0.00004	0.0003	0.0003
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.093	0.006	0.048	0.049
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.009	0.008	0.007	0.008
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	1.42	1.26	1.09	1.26
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.010	0.008	0.008	0.009
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	1.48	1.28	1.11	1.29
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.010	0.008	0.008	0.009
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	23.4	19.3	18.0	20.2
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	1.57	1.29	1.16	1.34
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	93.9	99.6	95.8	96.4
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	94.1	99.6	95.9	96.5

Table 2.0 Summary of particulate matter emission test results from samples collected at the exhaust stacks of Furnaces #2, #3, #4, and #5 at Ball-Foster Glass Container Co., LLC in Seattle, Washington on August 27-30, 1996.

Sample Run #	Cut Point Diameter D <sub>50</sub> (µm)	< PM <sub>10</sub> Emission Conc. w/Cond. (gr/dscf)	< PM <sub>10</sub> Emission Rate w/Cond. (lb/hr)
<b>Furnace #2 (North)</b>			
Run 1	10.26	0.042	1.97
Run 2	10.17	0.037	1.77
Run 3	10.09	0.043	2.09
Average	10.17	0.041	1.94
<b>Furnace #2 (South)</b>			
Run 1	9.50	0.092	3.60
Run 2	9.77	0.102	3.89
Run 3	9.78	0.098	3.93
Average	9.68	0.097	3.81
<b>Furnace #2 Average</b>		0.069	2.88
<b>Furnace #2 Total</b>			5.75
<b>Furnace #3</b>			
Run 1	10.04	0.024	4.49
Run 2	9.97	0.023	4.33
Run 3	10.06	0.025	4.83
Average	10.02	0.024	4.55
<b>Furnace #4</b>			
Run 1	10.02	0.030	4.36
Run 2	9.97	0.029	4.15
Run 3	10.05	0.027	4.00
Average	10.01	0.029	4.17
<b>Furnace #5</b>			
Run 1	9.90	0.021	2.98
Run 2	9.79	0.020	2.84
Run 3	9.84	0.018	2.45
Average	9.84	0.020	2.76

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 201A  
AM TEST-AIR QUALITY, LLC

FILE NAME: TIA\96-106WD\BFGSUM2N  
CLIENT: Ball Foster Glass  
LOCATION: Seattle, Washington

#2 FURNACE, NORTH STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	0630	0631	0632	
DATE:	8/27/96	8/27/96	8/27/96	
START TIME:	0843	1155	1448	
STOP TIME:	1049	1400	1659	
SAMPLE LENGTH (minutes):	122.4	122.9	127.9	
VOLUME SAMPLED (cubic feet):	53.160	54.553	57.854	55.189
VOLUME SAMPLED (dry std. cubic feet):	50.753	51.137	53.910	51.933
VOLUME SAMPLED (dry std. cubic meters):	1.437	1.448	1.527	1.471
STACK GAS MOISTURE (percent):	6.70	7.45	7.81	7.32
BAROMETRIC PRESSURE (inches of Hg):	29.94	29.95	29.95	29.95
STATIC PRESSURE (inches of H2O):	-0.26	-0.30	-0.29	-0.28
STACK PRESSURE (inches of Hg):	29.92	29.93	29.93	29.93
STACK GAS TEMPERATURE (degrees F.):	522.3	518.6	552.6	531.2
STACK GAS TEMPERATURE (degrees R.):	982.3	978.6	1012.6	991.2
CARBON DIOXIDE (percent):	5.7	5.0	6.0	5.6
OXYGEN (percent):	19.4	19.7	19.5	19.5
MOLECULAR WEIGHT (dry, g/g-mole):	29.69	29.59	29.74	29.67
MOLECULAR WEIGHT (wet, g/g-mole):	28.90	28.72	26.82	28.81
GAS VISCOSITY (micropoises):	291.0	289.6	298.5	293.0
AVERAGE VELOCITY HEAD (inches of H2O):	0.262	0.274	0.293	0.276
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	39.2	40.1	42.1	40.5
STACK DIAMETER (inches):	29.25	29.25	29.25	
STACK AREA (square feet):	4.67	4.67	4.67	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	5498.7	5604.4	5671.1	5591.4
STACK GAS AIRFLOW (actual cubic feet per min.):	10964	11220	11794	11326
NOZZLE DIAMETER (inches):	0.232	0.232	0.232	
ISOKINETICS (percent):	120	93	93	
CUT-POINT DIAMETER (D50) (microns):	10.26	10.17	10.09	10.17
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0004	0.0008	0.0006	0.0006
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.019	0.038	0.028	0.028
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.036	0.036	0.039	0.037
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	1.68	1.75	1.90	1.78
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.042	0.037	0.043	0.041
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	1.97	1.77	2.09	1.94
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.042	0.038	0.043	0.041
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	96.7	86.2	99.5	94.1
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	1.99	1.81	2.11	1.97
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	98.9	97.9	98.5	98.4
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	99.0	97.9	98.7	98.5

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 201A  
AM TEST-AIR QUALITY, LLC

FILE NAME: TIA\96-106WD\BFGSUM2S  
CLIENT: Ball Foster Glass  
LOCATION: Seattle, Washington

#2 FURNACE, SOUTH STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	0633	0634	0635	
DATE:	8/27/96	8/27/96	8/27/96	
START TIME:	0843	1155	1448	
STOP TIME:	1055	1410	1657	
SAMPLE LENGTH (minutes):	121.8	124.5	120.2	
VOLUME SAMPLED (cubic feet):	57.061	56.547	55.269	56.292
VOLUME SAMPLED (dry std. cubic feet):	55.383	54.392	52.953	54.243
VOLUME SAMPLED (dry std. cubic meters):	1.568	1.540	1.500	1.536
STACK GAS MOISTURE (percent):	15.50	15.22	14.42	15.05
BAROMETRIC PRESSURE (inches of Hg):	29.90	29.95	29.95	29.93
STATIC PRESSURE (inches of H2O):	-0.31	-0.29	-0.32	-0.31
STACK PRESSURE (inches of Hg):	29.88	29.93	29.93	29.91
STACK GAS TEMPERATURE (degrees F.):	980.2	978.9	940.5	966.5
STACK GAS TEMPERATURE (degrees R.):	1440.2	1438.9	1400.5	1426.5
CARBON DIOXIDE (percent):	13.8	16.7	11.1	13.9
OXYGEN (percent):	17.6	17.2	18.3	17.7
MOLECULAR WEIGHT (dry, g/g-mole):	30.91	31.36	30.51	30.93
MOLECULAR WEIGHT (wet, g/g-mole):	28.91	29.33	28.70	28.98
GAS VISCOSITY (micropoises):	414.2	413.8	403.5	410.5
AVERAGE VELOCITY HEAD (inches of H2O):	0.320	0.313	0.318	0.317
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	52.5	51.4	51.7	51.9
STACK DIAMETER (inches):	29.25	29.95	29.25	
STACK AREA (square feet):	4.67	4.67	4.67	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	4544.2	4429.8	4671.4	4548.5
STACK GAS AIRFLOW (actual cubic feet per min.):	14690	14248	14476	14471
NOZZLE DIAMETER (inches):	0.297	0.297	0.297	
ISOKINETICS (percent):	97	96	92	
CUT-POINT DIAMETER (D50) (microns):	9.50	9.77	9.78	9.68
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0006	0.0044	0.0017	0.0022
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.024	0.168	0.068	0.087
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.088	0.094	0.089	0.090
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	3.44	3.56	3.57	3.52
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.092	0.102	0.098	0.097
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	3.60	3.89	3.93	3.81
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.093	0.107	0.100	0.100
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	213.0	244.6	228.7	228.8
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	3.63	4.06	4.00	3.90
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	99.3	95.5	98.1	97.6
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	99.3	95.9	98.3	97.8

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 201A  
AM TEST-AIR QUALITY, LLC

FILE NAME: TIA\96-106WD\BFGSUM3  
CLIENT: Ball Foster Glass  
LOCATION: Seattle, Washington

#3 FURNACE

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	0636	0637	0638	
DATE:	8/28/96	8/28/96	8/28/96	
START TIME:	0926	1152	1419	
STOP TIME:	1125	1352	1623	
SAMPLE LENGTH (minutes):	118.5	119.4	123.9	
VOLUME SAMPLED (cubic feet):	50.840	52.002	53.693	52.178
VOLUME SAMPLED (dry std. cubic feet):	50.622	51.452	52.860	51.645
VOLUME SAMPLED (dry std. cubic meters):	1.434	1.457	1.497	1.463
STACK GAS MOISTURE (percent):	5.91	5.96	5.84	5.90
BAROMETRIC PRESSURE (inches of Hg):	30.25	30.25	30.25	30.25
STATIC PRESSURE (inches of H2O):	-0.36	-0.36	-0.35	-0.36
STACK PRESSURE (inches of Hg):	30.22	30.22	30.22	30.22
STACK GAS TEMPERATURE (degrees F.):	407.1	412.2	420.6	413.3
STACK GAS TEMPERATURE (degrees R.):	867.1	872.2	880.6	873.3
CARBON DIOXIDE (percent):	3.3	3.4	3.6	3.4
OXYGEN (percent):	20.6	19.8	19.8	20.1
MOLECULAR WEIGHT (dry, g/g-mole):	29.35	29.34	29.37	29.35
MOLECULAR WEIGHT (wet, g/g-mole):	28.68	28.66	28.70	28.68
GAS VISCOSITY (micropoises):	261.5	262.3	264.7	262.8
AVERAGE VELOCITY HEAD (inches of H2O):	0.479	0.470	0.502	0.484
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	49.7	49.4	51.2	50.1
STACK DIAMETER (inches):	48.5	48.5	48.5	
STACK AREA (square feet):	12.8	12.8	12.8	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	22142	21867	22494	22167.7
STACK GAS AIRFLOW (actual cubic feet per min.):	38257	38023	39441	38574
NOZZLE DIAMETER (inches):	0.210	0.210	0.210	
ISOKINETICS (percent):	103	105	101	
CUT-POINT DIAMETER (D50) (microns):	10.04	9.97	10.06	10.02
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0009	0.0005	0.0016	0.0010
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.169	0.085	0.304	0.186
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.022	0.022	0.024	0.023
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	4.14	4.21	4.62	4.32
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.024	0.023	0.025	0.024
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	4.49	4.33	4.83	4.55
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.025	0.024	0.027	0.025
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	56.2	53.9	60.9	57.0
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	4.66	4.42	5.13	4.74
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	96.1	98.0	93.8	96.0
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	96.4	98.1	94.1	96.2

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 201A  
AM TEST-AIR QUALITY, LLC

FILE NAME: TIA\96-106WD\BFGSUM4  
CLIENT: Ball Foster Glass  
LOCATION: Seattle, Washington

#4 FURNACE

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	0639	0640	0641	
DATE:	8/29/96	8/29/96	8/29/96	
START TIME:	0932	1212	1450	
STOP TIME:	1140	1411	1654	
SAMPLE LENGTH (minutes):	123.8	116.7	121.3	
VOLUME SAMPLED (cubic feet):	54.170	52.086	54.201	53.486
VOLUME SAMPLED (dry std. cubic feet):	52.551	49.875	51.167	51.198
VOLUME SAMPLED (dry std. cubic meters):	1.488	1.412	1.449	1.450
STACK GAS MOISTURE (percent):	6.78	7.02	7.01	6.94
BAROMETRIC PRESSURE (inches of Hg):	30.15	30.15	30.10	30.13
STATIC PRESSURE (inches of H2O):	-0.62	-0.62	-0.60	-0.61
STACK PRESSURE (inches of Hg):	30.10	30.10	30.06	30.09
STACK GAS TEMPERATURE (degrees F.):	470.8	475.9	474.8	473.8
STACK GAS TEMPERATURE (degrees R.):	930.8	935.9	934.8	933.8
CARBON DIOXIDE (percent):	3.7	3.2	3.3	3.4
OXYGEN (percent):	15.5	16.1	16.0	15.9
MOLECULAR WEIGHT (dry, g/g-mole):	29.21	29.16	29.17	29.18
MOLECULAR WEIGHT (wet, g/g-mole):	28.45	28.37	28.39	28.40
GAS VISCOSITY (micropoises):	275.0	276.5	276.2	275.9
AVERAGE VELOCITY HEAD (inches of H2O):	0.622	0.643	0.694	0.653
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	59.1	60.3	62.6	60.7
STACK DIAMETER (inches):	40.25	40.25	40.25	
STACK AREA (square feet):	8.84	8.84	8.84	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	16660	16866	17514	17013.3
STACK GAS AIRFLOW (actual cubic feet per min.):	31310	31956	33196	32154
NOZZLE DIAMETER (inches):	0.191	0.191	0.191	
ISOKINETICS (percent):	113	113	107	
CUT-POINT DIAMETER (D50) (microns):	10.02	9.97	10.05	10.01
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0038	0.0007	0.0003	0.0016
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.544	0.107	0.052	0.234
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.028	0.027	0.026	0.027
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	4.00	3.90	3.91	3.94
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.030	0.029	0.027	0.029
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	4.36	4.15	4.00	4.17
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.034	0.029	0.027	0.030
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	78.5	67.4	61.8	69.2
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	4.90	4.26	4.06	4.41
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (%):	88.0	97.3	98.7	94.7
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (%):	88.9	97.5	98.7	95.0

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 201A  
AM TEST-AIR QUALITY, LLC

FILE NAME: TIA\96-106WD\BFGSUM5  
CLIENT: Ball Foster Glass  
LOCATION: Seattle, Washington

#5 FURNACE

	RUN #1	RUN #2	RUN #3	AVERAGE
	-----	-----	-----	-----
LAB #:	0642	0643	0644	
DATE:	8/30/96	8/30/96	8/30/96	
START TIME:	0908	1139	1423	
STOP TIME:	1100	1336	1617	
SAMPLE LENGTH (minutes):	108.7	111.1	109.4	
VOLUME SAMPLED (cubic feet):	46.819	49.210	48.475	48.168
VOLUME SAMPLED (dry std. cubic feet):	46.563	48.378	47.374	47.438
VOLUME SAMPLED (dry std. cubic meters):	1.319	1.370	1.342	1.344
STACK GAS MOISTURE (percent):	6.01	6.00	5.95	5.99
BAROMETRIC PRESSURE (inches of Hg):	30.10	30.10	30.20	30.13
STATIC PRESSURE (inches of H2O):	-0.28	-0.28	-0.26	-0.27
STACK PRESSURE (inches of Hg):	30.08	30.08	30.18	30.11
STACK GAS TEMPERATURE (degrees F.):	347.2	347.9	343.1	346.1
STACK GAS TEMPERATURE (degrees R.):	807.2	807.9	803.1	806.1
CARBON DIOXIDE (percent):	3.1	3.0	3.1	3.1
OXYGEN (percent):	20.1	20.1	20.0	20.1
MOLECULAR WEIGHT (dry, g/g-mole):	29.30	29.28	29.30	29.29
MOLECULAR WEIGHT (wet, g/g-mole):	28.62	28.61	28.62	28.62
GAS VISCOSITY (micropoises):	245.5	245.7	244.4	245.2
AVERAGE VELOCITY HEAD (inches of H2O):	0.483	0.452	0.442	0.459
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	48.3	46.8	46.1	47.1
STACK DIAMETER (inches):	41.5	41.5	41.5	
STACK AREA (square feet):	9.39	9.39	9.39	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	16839	16284	16189	16437.5
STACK GAS AIRFLOW (actual cubic feet per min.):	27247	26366	25956	26523
NOZZLE DIAMETER (inches):	0.210	0.210	0.210	
ISOKINETICS (percent):	99	104	105	
CUT-POINT DIAMETER (D50) (microns):	9.90	9.79	9.84	9.84
> PM10 PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.0000	0.0004	0.0001	0.0002
> PM10 PARTICULATE MATTER EMISSION RATE (lb/hr):	0.000	0.056	0.014	0.023
< PM10 PARTICULATE MATTER CONC. W/O CONDENSIBLES (gr/dscf):	0.018	0.017	0.016	0.017
< PM10 PARTIC. MATTER EMISSION RATE W/O CONDENSIBLES (lb/hr):	2.63	2.40	2.21	2.41
< PM10 PARTICULATE MATTER CONC. W/CONDENSIBLES (gr/dscf):	0.021	0.020	0.018	0.020
< PM10 PARTIC. MATTER EMISSION RATE W/CONDENSIBLES (lb/hr):	2.98	2.84	2.45	2.76
TOTAL PARTICULATE MATTER CONCENTRATION (gr/dscf):	0.021	0.021	0.018	0.020
TOTAL PARTICULATE MATTER CONCENTRATION (mg/dscm):	47.2	47.5	40.7	45.1
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	2.98	2.90	2.47	2.78
PERCENT PARTICULATE MATTER < PM10 W/O CONDENSIBLES (x):	100.0	97.7	99.3	99.0
PERCENT PARTICULATE MATTER < PM10 W/CONDENSIBLES (x):	100.0	98.1	99.4	99.2

**Table 2.0** Summary of particulate matter emission test results from samples collected at the north and south exhaust stacks of Furnace #2 at Ball-Foster Glass Container Co., LLC in Seattle, Washington on January 22, 1997.

Sample Run #	Front-half P.M. Emission Concentration (gr/dscf)	Back-half P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Rate (lb/hr)
<b>Furnace #2 (North)</b>				
Run 1	0.020	0.002	0.022	1.02
Run 2	0.022	0.002	0.024	1.10
Run 3	0.024	0.001	0.025	1.14
<b>Average</b>	0.022	0.002	0.024	1.09
<b>Furnace #2 (South)</b>				
Run 1	0.034	0.006	0.040	1.73
Run 2	0.037	0.001	0.038	1.61
Run 3	0.038	0.003	0.041	1.75
<b>Average</b>	0.036	0.003	0.040	1.70
<b>Furnace #2 Average</b>	0.029	0.003	0.032	1.40
<b>Furnace #2 Total</b>				2.79

Front-half, back-half, and total particulate matter emission concentrations are presented in units of grains per dry standard cubic foot (gr/dscf). Total particulate matter emission rates are presented in units of pounds per hour (lb/hr).

# AMTEST

AIR QUALITY, LLC

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5  
AM TEST - AIR QUALITY, LLC

FILE NAME: TIA\96-172WD\M5SUM-N  
CLIENT: Ball-Foster Glass  
LOCATION: Seattle, Washington

#2 FURNACE, NORTH STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	1241	1242	1243	
DATE:	1/22/97	1/22/97	1/22/97	
START TIME:	1107	1335	1550	
STOP TIME:	1247	1513	1726	
SAMPLE LENGTH (minutes):	96.0	96.0	96.0	
VOLUME SAMPLED (cubic feet):	58.482	58.719	57.694	58.298
VOLUME SAMPLED (dry std. cubic feet):	58.880	58.771	57.798	39.217
VOLUME SAMPLED (dry std. cubic meters):	1.668	1.664	1.637	1.656
STACK GAS MOISTURE (percent):	7.56	7.69	7.28	7.51
BAROMETRIC PRESSURE (inches of Hg):	30.00	30.00	29.95	29.98
STATIC PRESSURE (inches of H <sub>2</sub> O):	-0.29	-0.27	-0.27	-0.28
STACK PRESSURE (inches of Hg):	29.98	29.98	29.93	29.96
STACK TEMPERATURE (degrees F.):	535.6	527.0	521.7	528.1
STACK TEMPERATURE (degrees R.):	995.6	987.0	981.7	988.1
CARBON DIOXIDE (percent):	5.0	4.7	4.7	4.8
OXYGEN (percent):	19.4	19.5	19.5	19.5
MOLECULAR WEIGHT (dry, g/g-mole):	29.58	29.53	29.53	29.55
MOLECULAR WEIGHT (wet, g/g-mole):	28.70	28.65	28.69	28.68
AVERAGE VELOCITY HEAD (inches of H <sub>2</sub> O):	0.255	0.252	0.246	0.251
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	39.0	38.7	38.1	38.6
STACK DIAMETER (inches):	29.25	29.25	29.25	
STACK AREA (square feet):	4.67	4.67	4.67	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	5361.1	5357.7	5316.1	5345.0
STACK GAS AIRFLOW (actual cubic feet per min.):	10915	10828	10656	10800
NOZZLE DIAMETER (inches):	0.310	0.310	0.310	
ISOKINETICS (percent):	102	102	101	
FRONT-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.020	0.022	0.024	0.022
BACK-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.002	0.002	0.001	0.002
TOTAL PARTICULATE EMISSION CONC. (gr/dscf):	0.022	0.024	0.025	0.024
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	1.02	1.10	1.14	1.09

# AMTEST

AIR QUALITY, LLC

## SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5 AM TEST - AIR QUALITY, LLC

FILE NAME: TIA\96-172WD\M5SUM-S  
CLIENT: Ball-Foster Glass  
LOCATION: Seattle, Washington

### #2 FURNACE, SOUTH STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	1244	1245	1246	
DATE:	1/22/97	1/22/97	1/22/97	
START TIME:	1107	1335	1550	
STOP TIME:	1248	1512	1728	
SAMPLE LENGTH (minutes):	96.0	96.0	96.0	
VOLUME SAMPLED (cubic feet):	59.362	59.330	61.289	59.994
VOLUME SAMPLED (dry std. cubic feet):	61.184	60.685	62.733	40.623
VOLUME SAMPLED (dry std. cubic meters):	1.733	1.719	1.777	1.743
STACK GAS MOISTURE (percent):	10.22	10.96	10.93	10.70
BAROMETRIC PRESSURE (inches of Hg):	30.00	30.00	30.00	30.00
STATIC PRESSURE (inches of H2O):	-0.30	-0.32	-0.30	-0.31
STACK PRESSURE (inches of Hg):	29.98	29.98	29.98	29.98
STACK TEMPERATURE (degrees F.):	727.6	744.8	768.3	746.9
STACK TEMPERATURE (degrees R.):	1187.6	1204.8	1228.3	1206.9
CARBON DIOXIDE (percent):	8.3	8.3	8.6	8.4
OXYGEN (percent):	18.5	18.5	18.4	18.5
MOLECULAR WEIGHT (dry, g/g-mole):	30.07	30.07	30.11	30.08
MOLECULAR WEIGHT (wet, g/g-mole):	28.83	28.75	28.79	28.79
AVERAGE VELOCITY HEAD (inches of H2O):	0.287	0.282	0.290	0.286
PITOT TUBE Cp:	0.84	0.84	0.84	
STACK GAS VELOCITY (feet per second):	45.1	45.1	46.1	45.4
STACK DIAMETER (inches):	29.25	29.25	29.25	
STACK AREA (square feet):	4.67	4.67	4.67	
STACK GAS AIRFLOW (dry std. cubic feet per min.):	5050.3	4934.5	4955.2	4980.0
STACK GAS AIRFLOW (actual cubic feet per min.):	12628	12621	12916	12722
NOZZLE DIAMETER (inches):	0.322	0.322	0.322	
ISOKINETICS (percent):	98	99	102	
FRONT-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.034	0.037	0.038	0.036
BACK-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.006	0.001	0.003	0.003
TOTAL PARTICULATE EMISSION CONC. (gr/dscf):	0.040	0.038	0.041	0.040
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	1.73	1.61	1.75	1.70

**Table 2.0** Summary of particulate matter emission test results from samples collected at the north and south exhaust stacks of #2 Furnace and the exhaust stacks of the #3, #4, and #5 Furnaces at Ball-Foster Glass Container Co., LLC in Seattle, Washington on July 14-18, 1997.

<b>Sample Run #</b>	<b>Front-half P.M. Emission Concentration (gr/dscf)</b>	<b>Back-half P.M. Emission Concentration (gr/dscf)</b>	<b>Total P.M. Emission Concentration (gr/dscf)</b>	<b>Total P.M. Emission Rate (lb/hr)</b>
<b>Furnace #2 (North)</b>				
Run 1	0.028	0.001	0.029	1.35
Run 2	0.025	0.002	0.027	1.22
Run 3	0.023	0.001	0.025	1.11
<b>Average</b>	0.025	0.001	0.027	1.23
<b>Furnace #2 (South)</b>				
Run 1	0.027	0.002	0.029	1.24
Run 2	0.023	0.001	0.024	1.02
Run 3	0.020	0.001	0.021	0.90
<b>Average</b>	0.023	0.001	0.025	1.05
<b>Furnace #2 Total</b>				<b>2.28</b>
<b>Furnace #3</b>				
Run 1	0.038	0.001	0.039	5.83
Run 2	0.036	0.001	0.036	5.44
Run 3	0.032	0.003	0.034	5.05
<b>Average</b>	0.035	0.002	0.036	5.44
<b>Furnace #4</b>				
Run 1	0.040	0.001	0.041	4.70
Run 2	0.037	0.002	0.039	4.70
Run 3	0.037	0.002	0.039	4.47
<b>Average</b>	0.038	0.002	0.040	4.62
<b>Furnace #5</b>				
Run 1	0.021	0.003	0.024	3.52
Run 2	0.020	0.003	0.023	3.47
Run 3	0.020	0.003	0.023	3.43
<b>Average</b>	0.020	0.003	0.023	3.47

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5**  
**AM TEST-AIR QUALITY, LLC**

File Name: CLR\97-070WDW#2\SUM  
 Client: Ball-Foster Glass Container  
 Location: Seattle, Washington

**#2 FURNACE, NORTH STACK**

	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	1829	1830	1831	
Date:	7/18/97	7/18/97	7/18/97	
Start Time:	0925	1152	1400	
Stop Time:	1108	1332	1538	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	51.398	51.562	51.758	51.573
Volume Sampled (dscf):	49.518	49.737	49.944	49.733
Volume Sampled (dscm):	1.402	1.409	1.414	1.408
Stack Gas Moisture (%):	8.35	8.94	9.11	8.80
Barometric Pressure ("Hg):	30.25	30.25	30.25	30.25
Static Pressure ("H <sub>2</sub> O)	-0.34	-0.35	-0.36	-0.35
Stack Pressure ("Hg):	30.23	30.22	30.22	30.22
Stack Temperature (°F):	548.0	543.9	553.2	548.4
Stack Temperature (°R):	1008.0	1003.9	1013.2	1008.4
Average Conc. CO <sub>2</sub> (%):	6.0	5.0	6.0	5.7
Average Conc. O <sub>2</sub> (%):	19.7	19.9	19.8	19.8
Average Conc. CO (ppm):	1.2	1.5	0.9	1.2
Molecular Weight (dry, g/g-mole):	29.75	29.60	29.75	29.70
Molecular Weight (wet, g/g-mole):	28.77	28.56	28.68	28.67
Average Velocity Head ("H <sub>2</sub> O):	0.261	0.257	0.254	0.257
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	39.5	39.2	39.1	39.3
Stack Diameter (inches):	29.25	29.25	29.25	
Stack Area (ft <sup>2</sup> ):	4.67	4.67	4.67	
Stack Gas Airflow (dscf/min.):	5361.2	5313.6	5240.0	5304.9
Stack Gas Airflow (acf/min):	11055	10983	10952	10997
Nozzle Diameter (inches):	0.286	0.286	0.286	
Isokinetics (%):	101	102	104	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.028	0.025	0.023	0.025
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.001	0.002	0.001	0.001
Total Particulate Matter Emission Conc. (gr/dscf):	0.029	0.027	0.025	0.027
Total Particulate Matter Emission Rate (lb/hr):	1.35	1.22	1.11	1.23

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5**  
**AM TEST-AIR QUALITY, LLC**

File Name: CLR\97-070WD\#2S\SUM  
 Client: Ball-Foster Glass Container  
 Location: Seattle, Washington

**#2 FURNACE, SOUTH STACK**

	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	1826	1827	1828	
Date:	7/18/97	7/18/97	7/18/97	
Start Time:	0925	1152	1400	
Stop Time:	1102	1331	1539	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	65.025	67.340	68.115	66.827
Volume Sampled (dscf):	64.919	66.517	66.683	66.040
Volume Sampled (dscm):	1.839	1.884	1.889	1.871
Stack Gas Moisture (%):	8.71	7.79	7.96	8.15
Barometric Pressure ("Hg):	30.20	30.20	30.20	30.20
Static Pressure ("H <sub>2</sub> O):	-0.26	-0.26	-0.26	-0.26
Stack Pressure ("Hg):	30.18	30.18	30.18	30.18
Stack Temperature (°F):	554.0	516.0	513.0	527.7
Stack Temperature (°R):	1014.0	976.0	973.0	987.7
Average Conc. CO <sub>2</sub> (%):	6.0	5.0	6.0	5.7
Average Conc. O <sub>2</sub> (%):	19.7	19.9	19.8	19.8
Average Conc. CO (ppm):	1.2	1.5	0.9	1.2
Molecular Weight (dry, g/g-mole):	29.75	29.60	29.75	29.70
Molecular Weight (wet, g/g-mole):	28.72	28.69	28.82	28.74
Average Velocity Head ("H <sub>2</sub> O):	0.227	0.221	0.218	0.222
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	37.0	35.8	35.4	36.1
Stack Diameter (inches):	29.25	29.25	29.25	
Stack Area (ft <sup>2</sup> ):	4.67	4.67	4.67	
Stack Gas Airflow (dscf/min.):	4967.9	5049.9	5000.3	5006.0
Stack Gas Airflow (acf/min):	10361	10036	9924.8	10107.3
Nozzle Diameter (inches):	0.347	0.347	0.347	
Isokinetics (%):	97	98	99	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.027	0.023	0.020	0.023
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.002	0.001	0.001	0.001
Total Particulate Matter Emission Conc. (gr/dscf):	0.029	0.024	0.021	0.025
Total Particulate Matter Emission Rate (lb/hr):	1.24	1.02	0.900	1.05

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5**  
**AM TEST-AIR QUALITY, LLC**

**File Name:** CLR\97-070WDV#3\SUM  
**Client:** Ball-Foster Glass Container  
**Location:** Seattle, Washington

	#3 FURNACE OUTLET			
	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	1823	1824	1825	
Date:	7/17/97	7/17/97	7/17/97	
Start Time:	0842	1043	1243	
Stop Time:	1018	1333	1419	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	61.637	62.700	61.094	61.810
Volume Sampled (dscf):	60.409	60.813	58.129	59.784
Volume Sampled (dscm):	1.711	1.722	1.646	1.693
Stack Gas Moisture (%):	8.06	8.09	8.02	8.06
Barometric Pressure ("Hg):	30.10	30.10	30.10	30.10
Static Pressure ("H <sub>2</sub> O):	-0.26	-0.26	-0.26	-0.26
Stack Pressure ("Hg):	30.08	30.08	30.08	30.08
Stack Temperature (°F):	559.2	552.2	540.6	550.7
Stack Temperature (°R):	1019.2	1012.2	1000.6	1010.7
Average Conc. CO <sub>2</sub> (%):	3.3	4.5	3.4	3.7
Average Conc. O <sub>2</sub> (%):	19.7	19.2	19.5	19.5
Average Conc. CO (ppm):	0.6	0.0	0.0	0.2
Molecular Weight (dry, g/g-mole):	29.32	29.49	29.32	29.38
Molecular Weight (wet, g/g-mole):	28.40	28.56	28.42	28.46
Average Velocity Head ("H <sub>2</sub> O):	0.358	0.364	0.347	0.356
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	46.9	47.0	45.7	46.5
Stack Diameter (inches):	48.5	48.5	48.5	
Stack Area (ft <sup>2</sup> ):	12.8	12.8	12.8	
Stack Gas Airflow (dscf/min.):	17301	17453	17180	17311
Stack Gas Airflow (acf/min):	36129	36207	35206	35847
Nozzle Diameter (inches):	0.286	0.286	0.286	
Isokinetics (%):	105	104	101	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.038	0.036	0.032	0.035
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.001	0.001	0.003	0.002
Total Particulate Matter Emission Conc. (gr/dscf):	0.039	0.036	0.034	0.036
Total Particulate Matter Emission Rate (lb/hr):	5.83	5.44	5.05	5.44

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5**  
**AM TEST-AIR QUALITY, LLC**

**File Name:** CLR\97-070WD\#4\SUM  
**Client:** Ball-Foster Glass Container  
**Location:** Seattle, Washington

	#4 FURNACE OUTLET			
	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	1817	1818	1819	
Date:	7/15/97	7/15/97	7/15/97	
Start Time:	0907	1115	1330	
Stop Time:	1049	1254	1510	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	46.851	48.318	47.486	47.552
Volume Sampled (dscf):	45.625	46.590	45.749	45.988
Volume Sampled (dscm):	1.292	1.319	1.296	1.302
Stack Gas Moisture (%):	7.87	7.46	7.25	7.53
Barometric Pressure ("Hg):	30.20	30.20	30.25	30.22
Static Pressure ("H <sub>2</sub> O):	-0.62	-0.43	-0.24	-0.43
Stack Pressure ("Hg):	30.15	30.17	30.23	30.18
Stack Temperature (°F):	463.7	452.6	470.2	462.2
Stack Temperature (°R):	923.7	912.6	930.2	922.2
Average Conc. CO <sub>2</sub> (%):	4.9	4.4	3.7	4.3
Average Conc. O <sub>2</sub> (%):	13.7	13.9	15.8	14.5
Average Conc. CO (ppm):	0.7	0.9	0.0	0.5
Molecular Weight (dry, g/g-mole):	29.33	29.26	29.22	29.27
Molecular Weight (wet, g/g-mole):	28.44	28.42	28.41	28.42
Average Velocity Head ("H <sub>2</sub> O):	0.406	0.437	0.400	0.414
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	47.5	49.0	47.3	47.9
Stack Diameter (inches):	40.25	40.25	40.25	
Stack Area (ft <sup>2</sup> ):	8.84	8.84	8.84	
Stack Gas Airflow (dscf/min.):	13368	14023	13336	13576
Stack Gas Airflow (acf/min):	25188	25976	25070	25411
Nozzle Diameter (inches):	0.237	0.237	0.237	
Isokinetics (%):	103	100	103	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.040	0.037	0.037	0.038
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.001	0.002	0.002	0.002
Total Particulate Matter Emission Conc. (gr/dscf):	0.041	0.039	0.039	0.040
Total Particulate Matter Emission Rate (lb/hr):	4.70	4.70	4.47	4.62

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5**  
**AM TEST-AIR QUALITY, LLC**

File Name: CLR\97-070WD\#5\SUM  
 Client: Ball-Foster Glass Container  
 Location: Seattle, Washington

**#5 FURNACE OUTLET**

	RUN #1	RUN #2	RUN #4	AVERAGE
Lab #:	1820	1821	1822	
Date:	7/16/97	7/16/97	7/16/97	
Start Time:	0845	1120	1433	
Stop Time:	1055	1302	1613	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	58.167	59.050	58.229	58.482
Volume Sampled (dscf):	56.645	56.615	55.175	56.145
Volume Sampled (dscm):	1.604	1.603	1.563	1.590
Stack Gas Moisture (%):	6.21	5.51	5.91	5.88
Barometric Pressure ("Hg):	30.20	30.20	30.10	30.17
Static Pressure ("H <sub>2</sub> O)	-0.59	-0.59	-0.59	-0.59
Stack Pressure ("Hg):	30.16	30.16	30.06	30.13
Stack Temperature (°F):	437.2	424.8	424.3	428.8
Stack Temperature (°R):	897.2	884.8	884.3	888.8
Average Conc. CO <sub>2</sub> (%):	2.3	2.3	1.2	1.9
Average Conc. O <sub>2</sub> (%):	20.1	20.1	20.5	20.2
Average Conc. CO (ppm):	97.8	110.4	55.0	87.7
Molecular Weight (dry, g/g-mole):	29.17	29.17	29.01	29.12
Molecular Weight (wet, g/g-mole):	28.48	28.56	28.36	28.47
Average Velocity Head ("H <sub>2</sub> O):	0.563	0.583	0.556	0.567
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	55.1	55.6	54.5	55.1
Stack Diameter (inches):	41.5	41.5	41.5	
Stack Area (ft <sup>2</sup> ):	9.39	9.39	9.39	
Stack Gas Airflow (dscf/min.):	17274	17805	17340	17473
Stack Gas Airflow (acf/min):	31050	31329	30723	31034
Nozzle Diameter (inches):	0.237	0.237	0.237	
Isokinetics (%):	105	102	102	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.021	0.020	0.020	0.020
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.003	0.003	0.003	0.003
Total Particulate Matter Emission Conc. (gr/dscf):	0.024	0.023	0.023	0.023
Total Particulate Matter Emission Rate (lb/hr):	3.52	3.47	3.43	3.47

## 2.0

### SUMMARY OF RESULTS

The following section of this report presents the results from the emissions testing. Refer to the Table of Contents to locate specific information. The summary tables in Section 2.0 of this report contain information obtained from computer printouts of results for each individual run which are included in Appendix A of this report. Appendix B of this report contains example calculations of results and copies of the original field and laboratory data sheets. Appendix C of this report contains miscellaneous supporting information.

EPA Method 5 samples were collected to quantify particulate and condensable matter emissions at the exhaust stack of Furnace #5 at Ball-Foster Glass Container Co., LLC. Three (3) Method 5 samples were collected at the Furnace #5 stack on January 13, 1998. Samples were collected over 96-minute sample periods to assure adequate detection limits. The results of the EPA Method 5 tests for quantifying particulate and condensable matter are summarized in Table 2.0 below, and on the following computer printout titled "Summary of Results - Methods 1, 2, 3A, 4, and 5."

**Table 2.0** Summary of particulate matter emission test results from samples collected at the #5 Furnace at Ball-Foster Glass Container Co., LLC in Seattle, Washington on January 13, 1998.

Sample Run #	Front-half P.M. Emission Concentration (gr/dscf)	Back-half P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Rate (lb/hr)
Run 1	0.024	0.002	0.026	3.51
Run 2	0.025	0.001	0.026	3.53
Run 3	0.025	0.0002	0.026	3.41
<i>Average</i>	<i>0.025</i>	<i>0.001</i>	<i>0.026</i>	<i>3.48</i>

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5  
AM TEST-AIR QUALITY, LLC**

**File Name:** EMD\97-007WDM5BH\SUM  
**Client:** Ball-Foster Glass Container  
**Location:** Seattle, Washington

	#5 FURNACE OUTLET			
	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	2519	2520	2521	
Date:	1/13/98	1/13/98	1/13/98	
Start Time:	0947	1220	1435	
Stop Time:	1130	1400	1616	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	53.074	53.794	52.257	53.042
Standard Volume (dscf):	53.807	54.328	52.719	53.618
Standard Volume (dscm):	1.524	1.539	1.493	1.519
Stack Gas Moisture (%):	6.77	6.61	6.47	6.62
Barometric Pressure ("Hg):	29.68	29.80	29.83	29.77
Static Pressure ("H <sub>2</sub> O):	-0.60	-0.58	-0.61	-0.60
Stack Pressure ("Hg):	29.64	29.76	29.79	29.73
Stack Temperature (°F):	432.8	427.2	421.9	427.3
Stack Temperature (°R):	892.8	887.2	881.9	887.3
Average Conc. CO <sub>2</sub> (%):	1.7	2.1	2.4	2.1
Average Conc. O <sub>2</sub> (%):	20.3	20.1	20.1	20.2
Average Conc. CO (ppm):	85.5	102.4	103.0	97.0
Molecular Weight (dry, g/g-mole):	29.08	29.14	29.19	29.14
Molecular Weight (wet, g/g-mole):	28.33	28.40	28.46	28.40
Average Velocity Head ("H <sub>2</sub> O):	0.475	0.485	0.451	0.470
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	51.1	51.3	49.2	50.5
Stack Diameter (inches):	41.5	41.5	41.5	
Stack Area (ft <sup>2</sup> ):	9.39	9.39	9.39	
Stack Gas Airflow (dscf/min.):	15714	15966	15461	15714
Stack Gas Airflow (acf/min):	28775	28886	27736	28466
Nozzle Diameter (inches):	0.248	0.248	0.248	
Isokinetics (%):	100	99	100	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.024	0.025	0.025	0.025
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.002	0.001	0.0002	0.001
Total Particulate Matter Emission Conc. (gr/dscf):	0.026	0.026	0.026	0.026
Total Particulate Matter Emission Rate (lb/hr):	3.51	3.53	3.41	3.48

## 2.0

**SUMMARY OF RESULTS**

The following section of this report presents the results from the emissions testing. Refer to the Table of Contents to locate specific information. The summary tables in Section 2.0 of this report contain information obtained from computer printouts of results for each individual run which are included in Appendix A of this report. Appendix B of this report contains example calculations of results and copies of the original field and laboratory data sheets. Appendix C of this report contains miscellaneous supporting information.

EPA Method 5 samples were collected to quantify particulate and condensable matter emissions at the exhaust stack of Furnace #5 at Ball-Foster Glass Container Co., LLC. Three (3) Method 5 samples were collected at the Furnace #5 stack on April 15, 1998. Samples were collected over 96-minute sample periods to assure adequate detection limits. The results of the EPA Method 5 tests for quantifying particulate and condensable matter are summarized in Table 2.0 below, and on the following computer printout titled "Summary of Results - Methods 1, 2, 3A, 4, and 5."

**Table 2.0** Summary of particulate matter emission test results from samples collected at the #5 Furnace at Ball-Foster Glass Container Co., LLC in Seattle, Washington on April 15, 1998.

Sample Run #	Front-half P.M. Emission Concentration (gr/dscf)	Back-half P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Rate (lb/hr)
Run 1	0.015	0.001	0.016	3.01
Run 2	0.012	0.001	0.013	2.35
Run 3	0.015	0.001	0.016	2.96
<i>Average</i>	<i>0.014</i>	<i>0.001</i>	<i>0.015</i>	<i>2.77</i>

## SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND 5 AM TEST-AIR QUALITY, LLC

File Name: EMD\98-047WDM5BHSUM  
 Client: Ball-Foster Glass Container Co., LLC  
 Location: Seattle, Washington

	#5 FURNACE OUTLET			
	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	2832	2833	2834	
Date:	4/15/98	4/15/98	4/15/98	
Start Time:	0959	1220	1430	
Stop Time:	1140	1359	1609	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	60.716	61.583	64.925	62.408
Standard Volume (dscf):	59.370	59.157	61.980	60.169
Standard Volume (dscm):	1.681	1.675	1.755	1.704
Stack Gas Moisture (%):	4.72	4.61	4.65	4.66
Barometric Pressure ("Hg):	30.19	30.18	30.19	30.19
Static Pressure ("H <sub>2</sub> O):	-0.65	-0.55	-0.60	-0.60
Stack Pressure ("Hg):	30.14	30.14	30.15	30.14
Stack Temperature (°F):	313.8	306.9	303.2	308.0
Stack Temperature (°R):	773.8	766.9	763.2	768.0
Average Conc. CO <sub>2</sub> (%):	2.4	2.3	2.2	2.3
Average Conc. O <sub>2</sub> (%):	20.0	20.0	20.0	20.0
Average Conc. CO (ppm):	11.0	9.0	3.2	7.7
Molecular Weight (dry, g/g-mole):	29.18	29.17	29.15	29.17
Molecular Weight (wet, g/g-mole):	28.66	28.65	28.63	28.65
Average Velocity Head ("H <sub>2</sub> O):	0.727	0.681	0.720	0.709
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	57.9	55.8	57.3	57.0
Stack Diameter (inches):	41.5	41.5	41.5	
Stack Area (ft <sup>2</sup> ):	9.39	9.39	9.39	
Stack Gas Airflow (dscf/min):	21389	20817	21456	21221
Stack Gas Airflow (acf/min):	32657	31466	32282	32135
Nozzle Diameter (inches):	0.225	0.230	0.230	
Isokinetics (%):	98	96	98	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.015	0.012	0.015	0.014
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.001	0.001	0.001	0.001
Total Particulate Matter Emission Conc. (gr/dscf):	0.016	0.013	0.016	0.015
Total Particulate Matter Emission Rate (lb/hr):	3.01	2.35	2.96	2.77

**Table 2.0** Summary of particulate matter emission test results from samples collected at the north and south exhaust stacks of the #2 furnace and the exhaust stacks of the #3, #4, and #5 furnaces at Ball-Foster Glass Container Corp., LLC in Seattle, Washington on November 11-12 and 18-19, 1998.

Sample Run #	Front-half P.M. Emission Concentration (gr/dscf)	Back-half P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Rate (lb/hr)
<b>Furnace #2 (North)</b>				
Run 1	0.037	0.008	0.046	2.01
Run 2	0.042	0.002	0.043	1.94
Run 3	0.048	0.002	0.051	2.23
<i>Average</i>	<i>0.042</i>	<i>0.004</i>	<i>0.047</i>	<i>2.06</i>
<b>Furnace #2 (South)</b>				
Run 1	0.062	0.008	0.070	2.99
Run 2	0.063	0.008	0.070	3.06
Run 3	0.076	0.009	0.085	3.65
<i>Average</i>	<i>0.067</i>	<i>0.008</i>	<i>0.075</i>	<i>3.23</i>
<b>Furnace #2 Total</b>				<b>5.29</b>
<b>Furnace #3</b>				
Run 1	0.022	0.001	0.023	4.35
Run 2	0.022	0.001	0.023	4.34
Run 3	0.021	0.0004	0.021	4.22
<i>Average</i>	<i>0.022</i>	<i>0.001</i>	<i>0.022</i>	<i>4.30</i>
<b>Furnace #4</b>				
Run 1	0.021	0.005	0.026	4.05
Run 2	0.023	0.002	0.025	3.80
Run 3	0.022	0.004	0.026	3.93
<i>Average</i>	<i>0.022</i>	<i>0.004</i>	<i>0.026</i>	<i>3.93</i>
<b>Furnace #5</b>				
Run 1	0.026	0.001	0.027	3.40
Run 2	0.024	0.0004	0.025	3.02
Run 3	0.024	0.001	0.025	3.10
<i>Average</i>	<i>0.025</i>	<i>0.001</i>	<i>0.026</i>	<i>3.17</i>

Front-half, back-half, and total particulate matter emission concentrations are presented in units of grains per dry standard cubic foot (gr/dscf). Total particulate matter emission rates are presented in units of pounds per hour (lb/hr).

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND PSAPCA 5  
AM TEST-AIR QUALITY, LLC**

**File Name:** EMD\98-145WDV#2\SUM  
**Client:** Ball-Foster Glass Container  
**Location:** Seattle, Washington

**#2 FURNACE, NORTH STACK**

	<b>RUN #1</b>	<b>RUN #2</b>	<b>RUN #3</b>	<b>AVERAGE</b>
Lab #:	4555	4556	4557	
Date:	11/18/98	11/18/98	11/18/98	
Start Time:	0944	1218	1445	
Stop Time:	1131	1406	1630	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	57.108	58.869	58.038	58.005
Volume Sampled (dscf):	56.628	57.697	56.482	56.936
Volume Sampled (dscm):	1.604	1.634	1.600	1.613
Stack Gas Moisture (%):	8.75	8.57	8.43	8.58
Barometric Pressure ("Hg):	29.75	29.75	29.75	29.75
Static Pressure ("H <sub>2</sub> O):	-0.20	-0.20	-0.20	-0.20
Stack Pressure ("Hg):	29.74	29.74	29.74	29.74
Stack Temperature (°F):	584.5	574.4	577.0	578.6
Stack Temperature (°R):	1044.5	1034.4	1037.0	1038.6
Average Conc. CO <sub>2</sub> (%):	7.2	7.4	7.4	7.3
Average Conc. O <sub>2</sub> (%):	17.9	17.7	17.7	17.8
Molecular Weight (dry, g/g-mole):	29.87	29.89	29.89	29.88
Molecular Weight (wet, g/g-mole):	28.83	28.87	28.89	28.86
Average Velocity Head ("H <sub>2</sub> O):	0.256	0.262	0.252	0.257
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	40.1	40.4	39.6	40.0
Stack Diameter (inches):	29.25	29.25	29.25	
Stack Area (ft <sup>2</sup> ):	4.67	4.67	4.67	
Stack Gas Airflow (dscf/min.):	5151.5	5243.3	5137.9	5177.6
Stack Gas Airflow (acf/min):	11237	11304	11089	11210
Nozzle Diameter (inches):	0.315	0.315	0.315	
Isokinetics (%):	99	99	99	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.037	0.042	0.048	0.042
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.008	0.002	0.002	0.004
Total Particulate Matter Emission Conc. (gr/dscf):	0.046	0.043	0.051	0.047
Total Particulate Matter Emission Rate (lb/hr):	2.01	1.94	2.23	2.06

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND PSAPCA 5  
AM TEST-AIR QUALITY, LLC**

File Name: EMD\98-145WD\#2\S\SUM  
Client: Ball-Foster Glass Container  
Location: Seattle, Washington

**#2 FURNACE, SOUTH STACK**

	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	4558	4559	4560	
Date:	11/18/98	11/18/98	11/18/98	
Start Time:	0944	1218	1443	
Stop Time:	1131	1406	1630	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	55.681	59.091	59.469	58.080
Volume Sampled (dscf):	55.726	58.104	58.559	57.463
Volume Sampled (dscm):	1.578	1.646	1.658	1.627
Stack Gas Moisture (%):	11.38	11.37	11.48	11.41
Barometric Pressure ("Hg):	29.75	29.75	29.75	29.75
Static Pressure ("H <sub>2</sub> O):	-0.22	-0.20	-0.20	-0.21
Stack Pressure ("Hg):	29.73	29.74	29.74	29.74
Stack Temperature (°F):	709.3	717.1	737.8	721.4
Stack Temperature (°R):	1169.3	1177.1	1197.8	1181.4
Average Conc. CO <sub>2</sub> (%):	8.1	8.3	8.0	8.1
Average Conc. O <sub>2</sub> (%):	16.6	16.5	16.7	16.6
Molecular Weight (dry, g/g-mole):	29.96	29.99	29.95	29.97
Molecular Weight (wet, g/g-mole):	28.60	28.62	28.58	28.60
Average Velocity Head ("H <sub>2</sub> O):	0.282	0.296	0.295	0.291
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	44.8	45.9	46.3	45.7
Stack Diameter (inches):	29.25	29.25	29.25	
Stack Area (ft <sup>2</sup> ):	4.67	4.67	4.67	
Stack Gas Airflow (dscf/min.):	4982.7	5078.6	5026.2	5029.2
Stack Gas Airflow (acf/min):	12530	12854	12962	12782
Nozzle Diameter (inches):	0.317	0.317	0.317	
Isokinetics (%):	99	102	103	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.062	0.063	0.076	0.067
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.008	0.008	0.009	0.008
Total Particulate Matter Emission Conc. (gr/dscf):	0.070	0.070	0.085	0.075
Total Particulate Matter Emission Rate (lb/hr):	2.99	3.06	3.65	3.23

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND PSAPCA 5  
AM TEST-AIR QUALITY, LLC**

**File Name:** EMD\98-145WD\#3\SUM  
**Client:** Ball-Foster Glass Container  
**Location:** Seattle, Washington

	#3 FURNACE OUTLET			
	RUN #1	RUN #2	RUN #3	AVERAGE
<b>Lab #:</b>	4549	4550	4551	
<b>Date:</b>	11/11/98	11/11/98	11/11/98	
<b>Start Time:</b>	0920	1132	1343	
<b>Stop Time:</b>	1056	1308	1519	
<b>Sample Length (minutes):</b>	96.0	96.0	96.0	
<b>Volume Sampled (ft<sup>3</sup>):</b>	85.427	83.895	90.392	86.571
<b>Volume Sampled (dscf):</b>	85.245	83.139	88.721	85.702
<b>Volume Sampled (dscm):</b>	2.414	2.355	2.513	2.427
<b>Stack Gas Moisture (%):</b>	6.00	6.15	5.95	6.03
<b>Barometric Pressure ("Hg):</b>	30.20	30.20	30.20	30.20
<b>Static Pressure ("H<sub>2</sub>O):</b>	-0.31	-0.30	-0.32	-0.31
<b>Stack Pressure ("Hg):</b>	30.18	30.18	30.18	30.18
<b>Stack Temperature (°F):</b>	360.5	357.3	356.9	358.2
<b>Stack Temperature (°R):</b>	820.5	817.3	816.9	818.2
<b>Average Conc. CO<sub>2</sub> (%):</b>	4.0	3.2	4.1	3.8
<b>Average Conc. O<sub>2</sub> (%):</b>	19.5	19.7	19.5	19.6
<b>Molecular Weight (dry, g/g-mole):</b>	29.42	29.30	29.44	29.39
<b>Molecular Weight (wet, g/g-mole):</b>	28.73	28.61	28.76	28.70
<b>Average Velocity Head ("H<sub>2</sub>O):</b>	0.464	0.456	0.485	0.468
<b>Pitot Tube C<sub>p</sub>:</b>	0.84	0.84	0.84	
<b>Stack Gas Velocity (ft/sec):</b>	47.6	47.2	48.5	47.8
<b>Stack Diameter (inches):</b>	48.5	48.5	48.5	
<b>Stack Area (ft<sup>2</sup>):</b>	12.8	12.8	12.8	
<b>Stack Gas Airflow (dscf/min.):</b>	22353	22217	22898	22489
<b>Stack Gas Airflow (acf/min):</b>	36639	36328	37347	36771
<b>Nozzle Diameter (inches):</b>	0.310	0.310	0.310	
<b>Isokinetics (%):</b>	97	95	99	
<b>Front-half Particulate Matter Emission Conc. (gr/dscf):</b>	0.022	0.022	0.021	0.022
<b>Back-half Particulate Matter Emission Conc. (gr/dscf):</b>	0.001	0.001	0.0004	0.001
<b>Total Particulate Matter Emission Conc. (gr/dscf):</b>	0.023	0.023	0.021	0.022
<b>Total Particulate Matter Emission Rate (lb/hr):</b>	4.35	4.34	4.22	4.30

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND PSAPCA 5  
AM TEST-AIR QUALITY, LLC**

**File Name:** EMD\98-145WD\#4\SUM  
**Client:** Ball-Foster Glass Container  
**Location:** Seattle, Washington

**#4 FURNACE OUTLET**

	<b>RUN #1</b>	<b>RUN #2</b>	<b>RUN #3</b>	<b>AVERAGE</b>
<b>Lab #:</b>	4578	4579	4580	
<b>Date:</b>	11/19/98	11/19/98	11/19/98	
<b>Start Time:</b>	0920	1135	1345	
<b>Stop Time:</b>	1105	1316	1524	
<b>Sample Length (minutes):</b>	96.0	96.0	96.0	
<b>Volume Sampled (ft<sup>3</sup>):</b>	56.923	57.174	57.328	57.142
<b>Volume Sampled (dscf):</b>	55.789	54.985	54.733	55.169
<b>Volume Sampled (dscm):</b>	1.580	1.557	1.550	1.562
<b>Stack Gas Moisture (%):</b>	6.38	6.35	6.84	6.52
<b>Barometric Pressure ("Hg):</b>	29.30	29.30	29.25	29.28
<b>Static Pressure ("H<sub>2</sub>O):</b>	-0.34	-0.34	-0.33	-0.34
<b>Stack Pressure ("Hg):</b>	29.28	29.28	29.23	29.26
<b>Stack Temperature (°F):</b>	456.1	448.5	447.3	450.6
<b>Stack Temperature (°R):</b>	916.1	908.5	907.3	910.6
<b>Average Conc. CO<sub>2</sub> (%):</b>	4.0	3.9	3.7	3.9
<b>Average Conc. O<sub>2</sub> (%):</b>	15.8	15.8	16.3	16.0
<b>Molecular Weight (dry, g/g-mole):</b>	29.27	29.26	29.24	29.26
<b>Molecular Weight (wet, g/g-mole):</b>	28.55	28.54	28.48	28.52
<b>Average Velocity Head ("H<sub>2</sub>O):</b>	0.736	0.702	0.707	0.715
<b>Pitot Tube C<sub>p</sub>:</b>	0.84	0.84	0.84	
<b>Stack Gas Velocity (ft/sec):</b>	64.5	62.7	63.0	63.4
<b>Stack Diameter (inches):</b>	40.25	40.25	40.25	
<b>Stack Area (ft<sup>2</sup>):</b>	8.84	8.84	8.84	
<b>Stack Gas Airflow (dscf/min):</b>	18055	17716	17699	17823
<b>Stack Gas Airflow (acf/min):</b>	34201	33266	33420	33629
<b>Nozzle Diameter (inches):</b>	0.229	0.229	0.229	
<b>Isokinetics (%):</b>	99	100	100	
<b>Front-half Particulate Matter Emission Conc. (gr/dscf):</b>	0.021	0.023	0.022	0.022
<b>Back-half Particulate Matter Emission Conc. (gr/dscf):</b>	0.005	0.002	0.004	0.004
<b>Total Particulate Matter Emission Conc. (gr/dscf):</b>	0.026	0.025	0.026	0.026
<b>Total Particulate Matter Emission Rate (lb/hr):</b>	4.05	3.80	3.93	3.93

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND PSAPCA 5  
AM TEST-AIR QUALITY, LLC**

**File Name:** EMD\98-145WD\#5\SUM  
**Client:** Ball-Foster Glass Container  
**Location:** Seattle, Washington

	#5 FURNACE OUTLET			
	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	4552	4553	4554	
Date:	11/12/98	11/12/98	11/12/98	
Start Time:	0900	1109	1331	
Stop Time:	1036	1245	1507	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	77.493	77.214	77.486	77.398
Volume Sampled (dscf):	76.698	76.643	76.358	76.566
Volume Sampled (dscm):	2.172	2.171	2.163	2.169
Stack Gas Moisture (%):	6.96	7.01	7.27	7.08
Barometric Pressure (°Hg):	30.15	30.15	30.00	30.10
Static Pressure (°H <sub>2</sub> O):	-0.41	-0.42	-0.41	-0.41
Stack Pressure (°Hg):	30.12	30.12	29.97	30.07
Stack Temperature (°F):	403.2	403.2	402.8	403.1
Stack Temperature (°R):	863.2	863.2	862.8	863.1
Average Conc. CO <sub>2</sub> (%):	4.5	4.1	4.7	4.4
Average Conc. O <sub>2</sub> (%):	19.5	19.6	19.4	19.5
Molecular Weight (dry, g/g-mole):	29.50	29.44	29.53	29.49
Molecular Weight (wet, g/g-mole):	28.70	28.64	28.69	28.68
Average Velocity Head (°H <sub>2</sub> O):	0.391	0.385	0.400	0.392
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	44.9	44.6	45.5	45.0
Stack Diameter (inches):	41.5	41.5	41.5	
Stack Area (ft <sup>2</sup> ):	9.39	9.39	9.39	
Stack Gas Airflow (dscf/min):	14499	14394	14582	14492
Stack Gas Airflow (acf/min):	25305	25137	25652	25365
Nozzle Diameter (inches):	0.310	0.310	0.310	
Isokinetics (%):	99	99	98	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.026	0.024	0.024	0.025
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.001	0.0004	0.001	0.001
Total Particulate Matter Emission Conc. (gr/dscf):	0.027	0.025	0.025	0.026
Total Particulate Matter Emission Rate (lb/hr):	3.40	3.02	3.10	3.17

Table 2.0 Summary of particulate and condensible matter emission test results from samples collected at the north and south exhaust stacks of Furnace #2 at Ball-Foster Glass Container Co., LLC in Seattle, Washington on January 14, 1999.

Sample Run #	Front-half P.M. Emission Concentration (gr/dscf)	Back-half P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Concentration (gr/dscf)	Total P.M. Emission Rate (lb/hr)
<b>Furnace #2 (North)</b>				
Run 1	0.022	0.004	0.027	1.19
Run 2	0.028	0.003	0.030	1.37
Run 3	0.028	0.003	0.032	1.47
<i>Average</i>	<i>0.026</i>	<i>0.003</i>	<i>0.030</i>	<i>1.34</i>
<b>Furnace #2 (South)</b>				
Run 1	0.023	0.005	0.029	1.15
Run 2	0.029	0.006	0.035	1.36
Run 3	0.033	0.001	0.034	1.35
<i>Average</i>	<i>0.028</i>	<i>0.004</i>	<i>0.033</i>	<i>1.29</i>
<b>Furnace #2 Total</b>				<b>2.63</b>

Front-half, back-half, and total particulate matter emission concentrations are presented in units of grains per dry standard cubic foot (gr/dscf). Total particulate matter emission rates are presented in units of pounds per hour (lb/hr).

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND PSAPCA 5  
AM TEST-AIR QUALITY, LLC**

**File Name:** CLR\99-004WD\#2\SUM  
**Client:** Ball-Foster Glass Container  
**Location:** Seattle, Washington

**#2 FURNACE, NORTH STACK**

	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	4593	4594	4595	
Date:	1/14/99	1/14/99	1/14/99	
Start Time:	0845	1125	1345	
Stop Time:	1027	1305	1528	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	58.918	58.738	61.640	59.765
Volume Sampled (dscf):	57.622	57.370	59.899	58.297
Volume Sampled (dscm):	1.632	1.625	1.696	1.651
Stack Gas Moisture (%):	9.95	9.77	10.02	9.91
Barometric Pressure ("Hg):	29.80	29.80	29.80	29.80
Static Pressure ("H <sub>2</sub> O):	-0.22	-0.22	-0.22	-0.22
Stack Pressure ("Hg):	29.78	29.78	29.78	29.78
Stack Temperature (°F):	607.4	607.5	585.8	600.2
Stack Temperature (°R):	1067.4	1067.5	1045.8	1060.2
Average Conc. CO <sub>2</sub> (%):	7.4	6.7	7.7	7.3
Average Conc. O <sub>2</sub> (%):	19.1	19.3	19.1	19.2
Molecular Weight (dry, g/g-mole):	29.95	29.84	30.00	29.93
Molecular Weight (wet, g/g-mole):	28.76	28.69	28.79	28.75
Average Velocity Head ("H <sub>2</sub> O):	0.272	0.275	0.288	0.278
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	41.8	42.1	42.5	42.1
Stack Diameter (inches):	29.25	29.25	29.25	
Stack Area (ft <sup>2</sup> ):	4.67	4.67	4.67	
Stack Gas Airflow (dscf/min):	5191.0	5238.8	5384.6	5271.5
Stack Gas Airflow (acf/min):	11708	11793	11907	11803
Nozzle Diameter (inches):	0.315	0.315	0.315	
Isokinetics (%):	100	98	100	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.022	0.028	0.028	0.026
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.004	0.003	0.003	0.003
Total Particulate Matter Emission Conc. (gr/dscf):	0.027	0.030	0.032	0.030
Total Particulate Matter Emission Rate (lb/hr):	1.19	1.37	1.47	1.34

**SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, AND PSAPCA 5**  
**AM TEST-AIR QUALITY, LLC**

File Name: CLR\99-004WD\#2S\SUM  
Client: Ball-Foster Glass Container  
Location: Seattle, Washington

	#2 FURNACE, SOUTH STACK			
	RUN #1	RUN #2	RUN #3	AVERAGE
Lab #:	4590	4591	4592	
Date:	1/14/99	1/14/99	1/14/99	
Start Time:	0845	1125	1345	
Stop Time:	1023	1300	1522	
Sample Length (minutes):	96.0	96.0	96.0	
Volume Sampled (ft <sup>3</sup> ):	49.799	49.675	50.186	49.887
Volume Sampled (dscf):	50.703	50.487	51.091	50.760
Volume Sampled (dscm):	1.436	1.430	1.447	1.438
Stack Gas Moisture (%):	11.07	11.30	11.28	11.22
Barometric Pressure (°Hg):	29.80	29.80	29.80	29.80
Static Pressure (°H <sub>2</sub> O):	-0.20	-0.24	-0.24	-0.23
Stack Pressure (°Hg):	29.79	29.78	29.78	29.78
Stack Temperature (°F):	644.1	655.4	650.9	650.1
Stack Temperature (°R):	1104.1	1115.4	1110.9	1110.1
Average Conc. CO <sub>2</sub> (%):	6.7	8.0	8.3	7.7
Average Conc. O <sub>2</sub> (%):	19.3	19.1	19.1	19.2
Molecular Weight (dry, g/g-mole):	29.84	30.04	30.09	29.99
Molecular Weight (wet, g/g-mole):	28.53	28.68	28.73	28.65
Average Velocity Head (°H <sub>2</sub> O):	0.233	0.226	0.235	0.231
Pitot Tube C <sub>p</sub> :	0.84	0.84	0.84	
Stack Gas Velocity (ft/sec):	39.5	39.0	39.7	39.4
Stack Diameter (inches):	29.25	29.25	29.25	
Stack Area (ft <sup>2</sup> ):	4.67	4.67	4.67	
Stack Gas Airflow (dscf/min):	4681.2	4565.3	4664.9	4637.1
Stack Gas Airflow (acfm/min):	11058	10923	11113	11031
Nozzle Diameter (inches):	0.317	0.317	0.317	
Isokinetics (%):	96	98	97	
Front-half Particulate Matter Emission Conc. (gr/dscf):	0.023	0.029	0.033	0.028
Back-half Particulate Matter Emission Conc. (gr/dscf):	0.005	0.006	0.001	0.004
Total Particulate Matter Emission Conc. (gr/dscf):	0.029	0.035	0.034	0.033
Total Particulate Matter Emission Rate (lb/hr):	1.15	1.36	1.35	1.29